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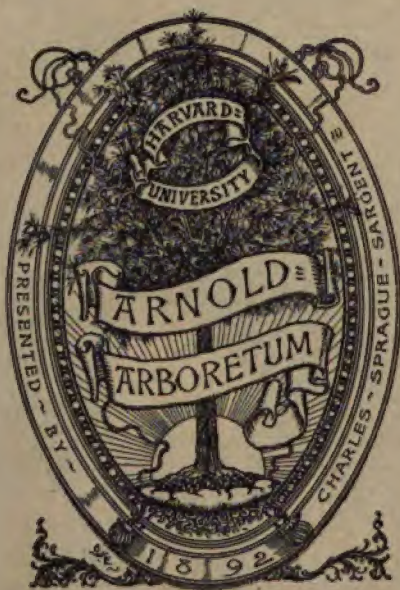
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TO the memory of the men of brain and brawn
who hewed out of the forests of the New
World room for Civilization, and to the men of
today who are making the American Lumber
Industry an agent of commercial progress
at home and abroad, this work is dedicated.

History of The Lumber Industry of America

By
JAMES ELLIOTT DEFEBAGH
(Editor of the American Lumberman)

Volume 1

CHICAGO
THE AMERICAN LUMBERMAN
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PREFACE.

Industry and commerce have received in the past but incidental recognition from the historian. He has sought to trace the history of peoples in the political movements in which they have been involved. The successful prosecution of war has appeared to him more notable than the continued preservation of peace. The achievements of diplomats and warriors have appeared more vital than the successes of men of business. The growing respect engendered abroad by a nation's army and navy has seemed a more attractive theme for discourse than the increase of its trade in the markets of the world.

Despite this neglect, commerce always has been a controlling factor in making the world's history. It always has been more important that men should live than that they should live under any particular government or at any particular place. The search for livelihood has guided the migrations of races and been the inciting cause of discovery, settlement and conquest. Encouragement, protection and control of trade have been the most frequent subjects of legislation.

It has been within recent years only that the world at large has accorded the manufacturer and the merchant a position coördinate with that of the warrior and the statesman. Out of this new appreciation have come histories of particular industrial movements and of numerous branches of industry; but, notwithstanding the influence of the forests on New World development and the importance of the present lumber industry of the United States, Canada and the Latin countries to the south, no comprehensive history of the lumber industry of America ever has been compiled.

The early explorers were in search of gold, but they found trees; and the earliest exports from the New World to the Old World were products of the forest. Such products have continued for more than four hundred years to be of conspicuous importance. In even the Twentieth Century the value of forest manufactures exported from British America is exceeded only by the value of the combined products of agriculture, grazing and allied pursuits. Some of the Central American countries derive the larger share of their incomes from their forest products.

While a history of the lumber business is justified fully by its importance, records are meager and its compilation is, therefore, difficult. In the preparation of this work the sources drawn upon have been so multitudinous as to render impracticable individual acknowledgment or complete reference to authority. Government reports and records of the United States and other American countries have been read diligently and every important fact concerning the industry has been extracted; thousands of individuals have been interviewed; the files of the *American Lumberman* and its predecessors, the *Northwestern Lumberman* and *The Timberman*, which have been the most fertile sources of information, have been carefully examined, and the files of other lumber journals—American, Canadian and English—have yielded their share of information.

Grateful acknowledgment is extended by the editor to the many individuals in private and public life who have interested themselves in this work and who have assisted in supplying many of the facts that go to make up this history. The compilation of the matter incorporated in this work has involved the expenditure of a vast amount of labor and a large sum of money; but, if it shall prove to be of interest and value to lumbermen and students of lumbering and shall supply a missing link in the industrial and commercial history of the world, its aim will have been fully attained and the ambition of its editor and its publishers will have been realized.

J. E. DEFEBBAUGH.

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CHAPTER I.

DISCOVERY AND EARLY SETTLEMENT.

Civilized man lives in houses, and as the house that does not contain wood in some form is practically unknown the lumber industry accompanies civilized man in all his migrations and progress. It was, in fact, a condition of his migration and advancement until the railroad brought forest and prairie together and made habitable the barren places of the earth. A treeless world might not be uninhabitable, but it is a historical fact that migration, racial progress and growth of population have been guided by the forest distribution of the world—modified, of course, by other conditions, but having that as one of their chief controlling influences.

The early history of civilization proves that countries which are now treeless and, therefore, thinly populated were once blessed with forests. The history of ancient Persia, Assyria and Canaan would be vastly different from what it is if those countries had been in their early days in the forestal condition they are now; or it might be more correct to say that they would have had no history. The disappearance of the forests led to the disappearance of the people; and, as today they are barren and almost depopulated because of the absence of the forests, if the forests had never existed their prominence in the history of civilization would have been withheld from them.

Wherever the cradle of the Aryan peoples may have been, their migrations led them by forest routes to forest countries, and it was not until recent times that the plains attracted them. This is true because shelter and fuel were necessities, which only the forest could furnish. As history goes, the discovery of coal is but of yesterday. Coal was undoubtedly known to the ancients, but it became an article of commerce not more than eight hundred years ago, and it was not until the discovery of the steam engine in 1705 that coal mining assumed important proportions. Until the Nineteenth Century coal in most countries was either a luxury or was used for industrial purposes, while the fuel of the people was wood. Therefore there was an im-

mediate dependence upon the forests which relaxed only when transportation—ample enough and cheap enough—linked the forests and the plains together. It was the railway that finally made habitable the treeless portions of the earth.

Dreamers have wondered what would have been the history of North America if the location of the forests and treeless plains had been reversed—if the discoverers and explorers sighting the shores of the Atlantic and the Pacific had found nothing but prairies, no matter how rich the soil—whether settlement would have awaited the invasion of the railroad. Happily such was not the case, but however inhospitable the climate and severe the aspect of the rockbound shores of New England in other respects the trees waved a welcome and promised shelter and warmth. So, whether the early discoverers were English, French, Spanish or Dutch, they found habitable shores and were able to establish their colonies in Florida and Virginia, on the Hudson, on Massachusetts Bay, on the St. Lawrence, on the coast of Nova Scotia, at the mouth of the Mississippi, in Central and South America and later on the Pacific shores.

From the coast, migration and settlement drifted inland, following the course of the rivers or striking boldly across the country, but always protected and supported by the forests. Whether we consider the individual pioneer with his family or the congeries of population, the villages and cities, all were in earlier days absolutely dependent upon the forests and endured separation from them only by the aid of commerce.

The first colonies in North America were, for the most part, made up of men of every trade and profession, but their development and the extension of their boundaries must be credited to the pioneers who struck off into the forest, a little removed from their fellows, and there hewed out their homes. These men combined in themselves all of the practical trades. They were hunters and fishermen as well as farmers; they were their own carpenters, blacksmiths, millers, tanners, shoemakers and weavers, and all of them were emphatically, at the beginning of the settlement, directly dependent upon the forest which gave them their material for building and for the simple implements of the time, their fuel and even their food. Yet, in a sense, the forest was their enemy, for they had to clear it away to make room for wheat and corn. The settler on American shores was the first American lumberman. He was a lumberman by necessity, as he was a carpenter, shoe-

maker and weaver. So the history of the lumber industry—for the lumber trade as a branch of commerce was a later development—is the history of progress, of settlement and of civilization.

As population increased and as the centers of population enlarged in importance, there came about a sharp differentiation and a natural apportionment of work; and so the lumber industry, which at the beginning merely supplied the needs of the individual settler in the forest, came to supply the requirements of the young towns and the cities of the continent. This was, however, a small matter, for all along the Atlantic coast, the shores of the Gulf of Mexico and on the banks of every tidal river the trees grew in profusion. Every village could be supplied from its own immediate resources. It was only when the increase in population made the requirements so great that local supplies were exhausted that a lumber industry that looked beyond the immediate neighborhood of its mills for the disposal of its product was either needful or possible. As the first settlers were the first lumbermen, so the first settlement was the first site of the lumber industry in America.

From the date of Columbus' first voyage in 1492, for more than a hundred years the process was discovery and exploration and conquest rather than genuine settlement. By the end of the Fifteenth Century the eastern coast of the three Americas had been roughly outlined. Columbus, the Cabots, Pinzon, Cabral, Cortereal, Vespucci, Balboa and others had cursorily examined the coast all the way from Hudson Strait to the vicinity of Bahia, on the eastern coast of Brazil. The lands discovered were usually claimed for the crowns which the voyagers represented and some of these claims were made good by colonization.

The next century was one of combined discovery, exploration, conquest and occupation. By its conclusion the coasts of both oceans had been well outlined and the general character of the countries determined. However, as late as 1600 there had been little genuine colonization, the only successful attempts at occupation being by the Spaniards and Portuguese, and these accomplishments were confined chiefly to the West Indies, Central America, the Isthmus of Panama and isolated portions of South America.

Until the Seventeenth Century, North America, which was destined to exceed all the others in population and wealth, remained practically virgin soil. For example, the Gulf of St. Lawrence was entered by Gaspar Cortereal in 1500, and Cartier voyaged up the St. Lawrence as

far as Montreal in 1535, but it was not until the middle of the century that any attempt at colonization within the present limits of Canada was made and not until 1608 that Quebec was founded.

A brief summary of some of the leading dates and names during the period of exploration may be pardoned. Columbus' first voyage, in 1492, resulted merely in the discovery of some of the West Indies, including Cuba, which he thought to be mainland. In 1493, seven weeks after the return of Columbus to Spain, Pope Alexander VI. assigned the lands discovered and to be discovered west of a certain line to Spain, and east of the same line to Portugal. This line was a great circle passing through the poles, and the following year was defined as passing 370 leagues west of the Cape Verde Islands. This edict was the basis of the Portuguese claims in the eastern part of South America and led to the Portuguese sovereignty over Brazil and its colonization by that power. It also led to a division of authority in the antipodes. The second voyage of Columbus, in 1493, resulted in further discoveries in the West Indies, including Jamaica. In 1498, on his third expedition, Columbus discovered Trinidad and coasted along the delta of the Orinoco and thence to the west. He set out on his fourth voyage in May, 1502, and during the following year he studied the coasts between the gulfs of Honduras and Darien.

In the meantime other navigators had been at work and other governments than that of Spain became interested. The English were early engaged in western explorations, and in 1497 Henry VII. sent out John Cabot, an Italian navigator, accompanied by Sebastian Cabot, his son, who planted the English flag on an unknown coast supposed to have been that of Labrador. The following year the two sailed as far south as Cape Florida and are supposed to have been the first to see the mainland of America. Nearly thirty years thereafter, in 1526, Sebastian Cabot, in the employ of Spain, began a voyage during which he discovered La Plata River and erected a fort at San Salvador, now Bahia.

In the same year that the Cabots began their work of exploration, 1497, Pinzon, Vespucci and others sailed from Cadiz. They are supposed to have first touched the coast of Honduras, whence they followed the coasts of Mexico and the United States, rounding Florida, and are believed to have sailed as far as Chesapeake Bay. In 1499 Vespucci with others followed the northern coast of South America for a long distance, including the coasts of Venezuela, the Guianas and part of the

coast of Brazil. In 1500 Pinzon struck the Brazilian coast near the site of Pernambuco and discovered the Amazon. During a period of about three years, beginning with 1500, Gaspar and Miguel Cortereal made voyages in the interest of Portugal to the north coast of North America, but mainly within the region previously explored by the Cabots.

Thus early in the beginning of the Sixteenth Century not much more had been done than to arouse the interest of the western countries of Europe in those unknown lands to the west, which were still supposed to be parts of Asia, for it was not until 1513 that Balboa discovered the Pacific and not until 1519 that Magellan passed through the straits that bear his name and thus discovered the long sought western passage to the Indies, a passage which had been sought on the north by the Cabots and by numerous explorers at every gulf along the entire eastern coast.

Exploration proceeded rapidly thereafter. Ponce de Leon discovered Florida in 1512. In 1524 Verrazani explored the coasts of Carolina and New Jersey and entered the present harbors of Wilmington, New York and Newport. During 1539, 1540 and 1541 De Soto explored Georgia, Alabama and Mississippi, and discovered the Mississippi River in the last year. In 1542 and the following year Cabrillo sailed along the Pacific Coast. In 1562 Ribault attempted to plant a Huguenot colony at Port Royal, Carolina, but it was abortive. Another Huguenot colony was attempted on St. Johns River, Florida, in 1564, by Laudonniere. It was destroyed by the Spaniards, but the following year, 1565, Menendez established St. Augustine, Florida. During the three years beginning with 1578 Drake made his famous explorations along the Pacific Coast, reaching as far north as Oregon, though he had been preceded by the Spanish (Cabrillo, 1542). The Spanish had been busy on the southern borders and in 1582 Espejo founded Santa Fe, New Mexico. In 1584 and 1587 Raleigh attempted to plant colonies in Virginia, but it will be seen that until the beginning of the Seventeenth Century there were but two settlements within the present boundaries of the United States, both made by the Spanish.

The exploration of Central America and the Isthmus of Panama proceeded rapidly during the early part of the Sixteenth Century and settlement followed closely on exploration. It should, however, be stated that colonization in its proper meaning was seldom attempted. Military and trading posts were established and maintained and these

posts gradually grew into colonies with entities of their own. Closely following the taking possession of the Isthmus and Central America occurred the conquest of Mexico, in which Spanish authority was established by Cortez in 1521, and Mexico became a vice-royalty in 1535. It is, perhaps, worth mentioning that the city of Belize, British Honduras, was a settlement by Wallace, a Scotch buccaneer, and the chief occupation of its people was wood-cutting, or the lumber business, and this business was early in the Eighteenth Century a subject of dispute.

Taking up in outline a review of the discovery and settlement of South America: The coast of Colombia was one of the earliest portions of America to be visited by the Spanish, but the first settlement was at Nombre de Dios, on the Isthmus, in 1508, and by the middle of the century Spanish power was fairly established and flourishing communities had arisen.

Venezuela was made a captain-generalcy in 1550. The coast of Brazil was a favorite field of early exploration by the Portuguese and by 1508 the coast had been outlined, for in that year Vincent Pinzon entered the Rio de la Plata. Amerigo Vespucci explored the coast under royal authority and enormous grants were made to persons who were willing to undertake settlement. Each captaincy, as these divisions of the territory were called, extended along fifty leagues of coast. But settlement was not attempted until about 1531.

The Argentine Republic was first visited by De Solis, in 1516, and in 1535 Mendoza attempted the establishment of Buenos Ayres, but it was not until 1580 that it was successfully accomplished.

The history of Uruguay dates from 1512 with the exploration and landing of De Solis, but no settlement was made until the Seventeenth Century. The coast of Peru was first visited in 1527. The conquest of Peru was accomplished in 1533, and the city of Lima was founded in 1535 by Pizarro.

The first Spanish invasion of Chili was in 1535 and 1536, at which time the city of Santiago was founded.

This brief review of early settlement may well be concluded by a list of some of the leading cities of the Americas and some of the earliest settlements, with the accepted dates of their establishment or occupation by Europeans.

BRITISH NORTH AMERICA.

CITY.	ESTABLISHED.	CITY.	ESTABLISHED.
Quebec.....	1608	St. John, New Brunswick.....	1739
Montreal.....	1642	Vancouver, British Columbia.....	1885
St. John's, Newfoundland.....	1613	Victoria, British Columbia.....	1843
Halifax, Nova Scotia.....	1749		

UNITED STATES.			
CITY.	ESTABLISHED.	CITY.	ESTABLISHED.
Portland, Maine	1632	Jacksonville, Florida.....	1816
Boston, Massachusetts.....	1630	St. Augustine, Florida.....	1565
Plymouth, Massachusetts.....	1620	Pensacola, Florida.....	1696
New York City, New York.....	1613	Mobile, Alabama.....	1702
Philadelphia, Pennsylvania.....	1681	New Orleans, Louisiana.....	1718
Baltimore, Maryland.....	1730	Galveston, Texas.....	1816
Annapolis, Maryland.....	1605	Portland, Oregon.....	1845
Jamestown, Virginia.....	1607	San Francisco, California.....	1775
Charleston, South Carolina.....	1670	San Diego, California.....	1768
Savannah, Georgia.....	1733		
MEXICO.			
City of Mexico.....	1522	Vera Cruz.....	1519
CENTRAL AMERICA.			
Guatemala City, Guatemala.....	1776	Colon, Panama.....	1849
San Salvador, Salvador.....	1528	Panama City, Panama.....	1518
WEST INDIES.			
Havana, Cuba.....	1519	Port au Prince, Haiti.....	1745
Santiago, Cuba.....	1514	San Juan, Porto Rico.....	1511
Kingston, Jamaica.....	1693		
SOUTH AMERICA.			
Bogota, Colombia.....	1538	Rosario, Argentina.....	1725
Caracas, Venezuela.....	1567	Buenos Ayres, Argentina.....	1535
Georgetown, British Guiana.....	1590	Quito, Ecuador.....	1534
Cayenne, French Guiana.....	1635	Guayaquil, Ecuador.....	1531
Para, Brazil.....	1614	Lima, Peru.....	1535
Bahia, Brazil.....	1503	La Paz, Bolivia.....	1548
Rio de Janeiro, Brazil.....	1502	Santiago, Chili.....	1541
Asuncion, Paraguay.....	1537	Concepcion, Chili.....	1550
Montevideo, Uruguay.....	1729		

What did the original explorers of the coasts of America discover in respect to the forests? They found a wooded coast from the Strait of Belle Isle, 52 degrees north latitude, to the mouth of the Rio de la Plata, 35 degrees south latitude, practically without a break. The forest fringed the shores for that enormous distance, spanning nearly one-fourth of the earth's circumference and much augmented by the many and great indentations of the shore line. But what lay back of the wooded shores? For the most part a solid forest extended inland, in some places for two thousand miles. Notwithstanding the great areas of arctic muskeg in the north, the barren plains and mountains of the extreme south and the great treeless areas between—the prairies, the pampas, the llanos—and notwithstanding the areas lifted high above the treeline by the Rockies, the Sierras and the Cordilleras, the western continent was one of forests. It is difficult to define the treeless areas and to say exactly what percentage of the area of any one country or state was wooded or treeless, but in an approximate way some general facts may be stated.

Canada was and is a forested, or rather a wooded, country. Botanists, geographers and students of economics note a difference between forested and wooded areas. The forests yield timber of commercial

value, but the wooded areas offer a welcome and means of livelihood to the settler. The total area of Canada, excluding Newfoundland and Labrador, is estimated at 3,745,574 square miles. Of this great area 1,351,505 square miles is estimated to be still wooded. It is probable that the original wooded area of Canada was about 1,690,000 square miles. All of the arctic territory of Franklin, estimated at 500,000 square miles, and parts of Yukon and Mackenzie and more than half of Keewatin are and were treeless, owing to the influence of their arctic climate. The Labrador Coast and the northern part of Ungava are also largely or wholly treeless. There are also the great prairies of Assiniboia, Saskatchewan and Alberta. Not considering the areas which are treeless because of their northern latitude, fully ninety percent of Canada was wooded. Newfoundland's coast was forbidding, but its interior was heavily wooded.

What is now the United States presented an almost solid and continuous forest from the Atlantic to the Mississippi River and in places still farther west; and then, after an interval of treeless plains, came the mountains with their forest groups and beyond them the wonderful arboreal wealth of the Pacific Coast. The total land surface of the continental United States, excluding Alaska, is 2,972,594 square miles. It is estimated that the present forest area is about 1,000,000 square miles; but, combining the fragmentary records that are to be found and estimating areas from the history of settlement and of agricultural development, as well as by the effect produced by the lumbering industry, it can be asserted with confidence that the original forested area of the present United States was at least 1,400,000 square miles, or nearly one-half of the entire land area.

Alaska has an area of about 591,000 square miles. Its wooded area, some of which is densely covered with large timber, can be safely estimated at about 100,000 square miles, while a much greater area is covered with brush.

The total area of Mexico is 767,000 square miles, of which about 150,000 square miles are of woodland.

The area of Central America is 163,465 square miles, of which about 100,000 square miles is estimated to have been forested.

South America has for the most part a climate favorable to tree growth mainly of the tropical sort, due to its peculiar formation. The important mountain system of the continent lies close to the Pacific Coast, and in it many rivers which empty into the Atlantic Ocean or the

Caribbean Sea have their rise. The eastern trade winds sweep over the continent, depositing moisture as they go, but are finally exhausted by the Andes and the other great mountain systems of the western coast. Thus the abundantly watered interior of the continent north of the Paraguay River is largely forested. There are exceptions in the llanos of the Orinoco and in some of the tablelands of the west, and Argentina is largely open grass land or barren plains. The total area of South America is estimated at about 7,685,000 square miles. A careful review of the conditions in each country leads to the conclusion that of this total area at least 6,000,000 square miles are naturally wooded. The great western ranges lift themselves above the treeline, the extreme southern part of the continent is almost antarctic in its characteristics and there are some naturally treeless plains, but, as noted above, approximately seventy percent of the area is wooded and the vast stretches of forest are of the most luxuriant kind. The growth of vegetation in South America is the most varied and the heaviest to be found in the world. Even in Africa only comparatively small and isolated portions compare with it.

Summing up the Americas we find the following results in total area and wooded area:

	Total area, square miles	Wooded area, square miles
British North America.....	3,795,308	1,725,000
United States, with Alaska.....	3,572,040	1,140,000
Mexico.....	787,000	150,000
Central America.....	183,485	100,000
South America.....	7,685,000	6,000,000
Total.....	15,982,813	9,115,000

Consequently, of the total area of the New World, more than fifty-five percent was covered with forests, which were most dense on the eastern coast, the one first approached by discoverers and explorers. The forests ranged from the light and easily worked woods of general utility of North America, such as the white and yellow pine, to the heavy and hard woods of the tropics and semitropics, adapted to multitudes of uses according to their qualities of beauty in color and grain and their adaptability to ornamental use, or as dye stuffs. Hence, the lumber industry was practically the first to be established and to form the basis of eastbound commerce across the Atlantic. Before grain, cotton, furs or even tobacco were exported from the Americas, lumber and timber had already established themselves in the favor of the Old World, and many of the explorers who were searching for gold returned with wood.

These subjects, both from historical and present statistical stand-

points, will be treated under the heads of the countries, states or provinces concerned. In taking up the more detailed account of the origin and development of the lumber industry it has been deemed best to treat the subject not entirely chronologically but to a certain extent geographically and with regard to its present magnitude and highest development. Thus, beginning with North America, and in that continent governed somewhat by geographical relations, first place is given to the British possessions. If a chronological arrangement had been determined upon, undoubtedly preference would have been given to Central America and the northern part of South America. Again, in North America proper the industry might be supposed to have witnessed its first development in connection with the oldest settlements. Such undoubtedly was the fact, but St. Augustine, and Florida as a whole, for hundreds of years played but a minor part in the forestal development of the continent and little or no part in international commerce. The early English settlers in Virginia were comparatively little concerned about wood. It was on the northeastern coast of the United States and in the Maritime and Laurentian provinces of Canada that the lumber industry early reached a high development and first became an important element in international trade. Geographical considerations and the further fact that within Canada lie the northern boundaries of the tree growths of the continent constrain us to take up first Canada rather than the United States, and the Maritime provinces rather than Maine.

CHAPTER II.

NORTH AMERICAN FOREST GEOGRAPHY.

Before entering into a minute discussion of the timber resources and the lumber history of Canada, it is well to review briefly the North American continent in its relation to tree distribution, especially with reference to the United States and Canada, which countries are one in their forest characteristics. While there is one prominent tree species which is almost wholly confined to Canada, and a few others whose native habitat is largely within its area, and while about half of the tree species of the continent, belonging to the southern United States, do not appear north of the international boundary, that arbitrary line of demarcation between the two countries cuts across the mountains, the treeless plains, the forested areas and the lines of tree growth; so that in a discussion of tree distribution the two countries should be treated as one, the differences being determined by soil and climatic conditions which have no relation to political divisions.

It should be noted first that the Atlantic Coast, including its islands, is practically all timbered from the Strait of Belle Isle, or certainly from the northern boundary of the main body of Newfoundland, to the Strait of Florida. The treeline follows the Gulf Coast from near the southern point of Florida to about west of Galveston, Texas, so that the Gulf and Atlantic coasts of the United States, with small exceptions, are timbered.

As the northern arm of Newfoundland is practically barren, so is the Labrador Coast. Starting from the Strait of Belle Isle, the northern forest limit runs a little inland from the coast, following the boundary between Labrador and Ungava to Ungava Bay; thence bending westerly and southerly it strikes Hudson Bay at about 57 degrees north latitude. The northern limit on the western side of Hudson Bay begins farther north, at about Fort Churchill, and follows an approximately straight line northwestward, passing north of Great Slave Lake, to the mouth of the Mackenzie River, north of the Arctic Circle; thence it turns to the southwest through Alaska, striking the coast again in the southwestern part of that American territory.

The Pacific Coast of North America has characteristics quite different from those of the Atlantic Coast, owing to the mountain uplift which closely follows the coast. Instead of a solid and wide body of timber, as is the condition on the Atlantic Coast, there are smaller areas heavily timbered, intersected and separated by mountain areas which are nearly or quite treeless. The presence of the mountains further results in a semiarid condition farther inland. Practically all the way from Cook Inlet, in Alaska, to the Bay of San Francisco, the coast has a continuous fringe of heavy forest growth, widening out as local topography will permit into the great forests which are found in British Columbia, Washington and Oregon.

The western mountain and plateau country of the continent is more or less timbered throughout, barren plains being crossed or bounded by forested mountain slopes, or the barren mountains of the North being penetrated by tree-lined valleys. This condition obtains, with variations due principally to latitude, all the way from the Alaskan peninsula to the Gulf of Tehuantepec.

Between the widespread and comparatively solid and uniform forests of the East and the broken and varied forests of the West lies the great, almost treeless, interior plain of the continent. The boundaries of this treeless plain may be thus roughly outlined: Starting from Galveston, Texas, the line runs in an approximately northern direction through the eastern part of Texas and the western part of Indian Territory. Thence it turns eastward, crossing the southeastern corner of Kansas, thence across Missouri, thence bending into Illinois and reaching just beyond the Indiana line. Thence in a curve it turns to the north and northwest, striking the Mississippi River in northern Illinois, leaving it in southern Minnesota, and passes north between Red Lake and the Red River of the North. Crossing the international boundary in a northerly direction, it sweeps around Winnipeg to the northwest and strikes about the northwestern corner of Manitoba. Thence northwesterly and westerly it crosses Saskatchewan and northern Alberta, and then, turning again to the southwest and south, follows the line of the Rocky Mountains back along the western border of Alberta, across Montana, Wyoming, Colorado and New Mexico, to and across the Mexican border. West of the latter part of this line is the broken mountain flora previously described.

Within this great interior plain are trees, but few forests, so that in a general way the line described surrounds the great agricultural and

grazing section of the continent, the rich agricultural regions east of the prairies having been won from the forest through more than a century of settlement and development.

TREE SPECIES AND THEIR DISTRIBUTION.

It will be seen from the above that the conformation of the forested area of the United States and Canada (including all the solid, or nearly solid, formations of arboriferous flora) is extremely irregular. It would, however, be expected that when we come to study the constituent tree species of the forest they would show a gradual and somewhat regular latitudinal gradation from tropical and sub-tropical species in the South to the most arctic species, bounded on the north by a zone where no vegetation except lichens and mosses can exist. While the above is true in a general way, yet the northern and southern limits of most tree species have little relation to isothermal lines of mean annual temperature, showing that there are potent influences other than temperature to be considered. Botanists classify these as climatic, including amount and distribution of light, heat and moisture; edaphic or soil influences, including soil formations, earth-moisture, etc., and biotic, or the influences of other plants, of insects and animals, and of decaying animal and vegetable matter. A more specific summary of the influences governing tree distribution has been prepared by Doctor Robert Bell, of the Geological Survey of Canada,¹ as follows:

1. Distance or proximity of the sea, or of the areas which were covered by it in recent geological times.
2. Changes which have taken place in the arrangement of land and water while the trees were spreading over the continent.
3. General dryness or moisture of the climate affecting considerable areas.
4. Extremes of heat and cold.
5. Local heat and moisture from lakes and rivers.
6. General elevation above the sea.
7. Local elevation (with consequent dryness) over level, wet or cold lands.
8. Large local depressions.
9. Diseases and insect pests.
10. Rapid or slow natural means of dispersion.

This summary is quite complete, but a better idea of the logical re-

¹"The Geographical Distribution of Forest Trees in Canada."—*Scottish Geographical Magazine*, June, 1897, pp. 281-296.

CONDITIONS GOVERNING TREE GROWTH.

Internal..	Facilities for seed distribution....	Prevalence of fungous or other diseases affecting the species.	By elements.....	By animals.....	By wind. Water.	As food. As nest material. By attachment to fur or feathers.	General—Ability of the local forest to resist fires, windstorms, etc.	Biotic.....	Edaphic or soil influences.....	Local.....	Proximity of lakes or rivers.....	Proximity of salt water.....	Moisture.....	Sunlight—Proportion of fair days in growing season.	General.....	Temperature.....	Mean annual. Extremes of heat and cold. Frequency and suddenness of extreme changes.
<p style="text-align: center;">Vitality—Including adaptability to variations in environment. Pecundity—Including ability to fruit under widely varying conditions.</p>																	

INFLUENCE OF PAST CONDITIONS UPON THE PRESENT.

It would be an error to interpret the foregoing outline as applying solely to influences existing at the present time or even in the immediate past. We must go back thousands of years to find the origin of some of the influences affecting the present distribution of tree species; while the evolution or development of existing arboriferous flora has been a process extending over an inconceivably longer period. A brief review of past geologic conditions is therefore necessary as a foundation to an intelligent discussion of existing forest formations.

In the evolution of plant forms upon the earth the trees are comparatively recent arrivals. It was formerly believed that the coniferæ were represented in the luxuriant vegetation of the Carboniferous period whose remains are our coal deposits; but it is now known that the fossil remains which had been identified as coniferous wood were really the trunks of huge ferns, nearly as large as our forest growths of to-day, and that the ferns and their allies constituted about seventy-five percent of the vegetation of that period. In the next or Triassic period appeared the cycads,^{1a} trees closely allied to the coniferæ and still plentifully represented in tropical species, though existing in our country only in a few Florida species and in *Cycas revoluta* and some other common greenhouse plants. These were closely followed by true coniferæ, which had their maximum development in the next or Jurassic period. They are estimated to have constituted at that time sixty percent of the earth's vegetation. Among the earliest fossil coniferæ are found the Araucarian pines, closely related to those now found in South America, though they have entirely disappeared from North America. A little later appeared Sequoian pines not greatly different from the only two species of that genus now left upon the earth, *Sequoia washingtoniana* and *Sequoia sempervirens*, both restricted to California, though their ancestors have left their impress upon the Triassic rocks of widely distributed areas of the United States. The "bigtrees" and redwoods are therefore forest patriarchs not only in size and individual longevity but also in ancient ancestry; they belong to the First Families of the Forest, and were probably represented here six or seven millions of years before the existing mountain chains of the continent were upheaved from the Tertiary plains. If they are now confined to the Pacific Coast, it is probably not because of the Rocky Mountain bar-

^{1a}Geologists are not agreed as to this order of appearance. Professor N. S. Shaler, of Harvard University, writing in 1896 (*Aspects of the Earth*), gave the order as follows: Conifers and yews, followed by palms, cypresses and cycads.

rier, but because they find there the only congenial habitat remaining to them—conditions of heat and moisture most nearly approaching those which must have prevailed when their ancestors flourished in the old geological summer when the land was flat, when the ocean beds were not deep enough to hold all the waters nor the shores of the continent high enough to resist their partial invasion.

Compared with the coniferæ in general the greatly diversified hardwood families are modern arrivals, though the first of them can be traced back as far as the Cretaceous period, next following the Jurassic, three million years or so ago. This is a very brief period as geologists reckon time, yet during that period the hardwoods had their evolution, their maximum of development and a rapid decline, so that in nearly all the botanical families the fossil species outnumber those now existing. One of the most important deciduous lumber trees, the yellow poplar (*Liriodendron tulipifera*), is the sole surviving species of a genus which formerly comprised many species. The same is true of sassafras (*Sassafras sassafras*), and true in a less extreme measure of many other genera. Including the coniferæ also, it may be said that the present forests are a bare remnant of those which have existed on the continent in recent geological times, and that the tree species now represented in North America are very limited compared with those of that past. It is also true that we have here over five hundred tree species as compared with barely a dozen indigenous to the British Isles, and in almost any square mile of typical forest growth in the United States may be found more different species than in all of Europe.^{1b}

INFLUENCE OF CLIMATIC CHANGES.

This decline in the number of tree species and in the extent of the forests does not necessarily imply a biological decline; that is, it does not necessarily imply that the present tree species are in any sense degenerates, as are the ferns of today compared with their giant ancestors of the Carboniferous period. Our present trees are undoubtedly the highest possible development of their present environment, and the changes in the forest have been undoubtedly caused by great climatic changes occurring later than the geologic periods which have been discussed in connection with the evolution of tree forms, and which changes

^{1b} "The reason seems to be that the glacial periods in Europe serve to overwhelm the vegetable life, and this because when the glacial envelope comes upon the continent and forces the army of plants down to the southward, they have no secure field for retreat, as in North America, but find their migrations stopped by the great gulf of the Mediterranean. It is likely that the wide difference between the richness of the forest life in the Old World and the New is, in part at least, determined by this cause."—Prof. N. S. Shaler, *Aspects of the Earth*, 286.

will now be considered in connection with their influences upon the present distribution of tree species, with which they have much to do.

It is difficult for the average layman, who conceives of the earth as a gradually cooling sphere, to grasp the idea of the great differences in mean temperature which have undoubtedly existed upon its surface at different periods, or to evolve any theory to account for them. Even the geologists, though the facts are indisputably written in their rock records, have as yet agreed upon no hypothesis, and have sought for the cause in an eccentric orbit of the earth around the sun, in abnormal altitudinal elevation of the fields of glacial action and in variations of the earth's atmosphere. The most generally accepted though not firmly established hypothesis takes the last direction and is based upon possible variations in the amount of carbonic acid gas¹⁰ in the atmosphere at different periods. According to this hypothesis there have been long periods during which the carbonic acid gas of the atmosphere has been eroding mountain rocks and has been washed down to the sea in the form of bicarbonates of lime and of other rock alkalis, this action continuing until land elevations were reduced to the plain level, when erosion would be at its minimum until other mountains had been upheaved for it to act upon. During this rest period the bicarbonates in the expanse of waters would be converted into monocarbonates and the surplus of carbonic acid gas be again restored to the atmosphere in readiness for a second cycle of change. It is known that the present proportion of this gas in our atmosphere, though extremely small, has a definite influence in imprisoning atmospheric heat and preventing the diffusion of the earth's heat into surrounding space; that a small percentage of increase in the amount would greatly extend the climatic conditions of the tropical and temperate zones northward, while if the small amount now in our atmosphere were reduced by one-half it would restore the conditions of the Glacial period.

Whether or not this interesting theory shall stand the test of further investigation, the fact is known that during the Tertiary ages following the Cretaceous period already mentioned (during which the hardwood trees and other angiosperms appeared) a temperate climate extended in North America very close to the north pole and the territory was covered with vast forests consisting of species not greatly different from those which still survive, together with tropical forms. This condition was succeeded, probably so gradually that little or no change

¹⁰ In modern chemical terminology "carbon dioxide," though the older term still has the widest popular use.

would have been apparent during the average tree lifetime, by the Pleistocene or Glacial epoch of the Quaternary period, at the culmination of which a thick ice sheet covered America as far south as northern Pennsylvania, the Ohio River Valley as far west as the Mississippi River, and then through central Missouri and northward to near the international boundary line and westward to the Rocky Mountains. Trees as well as all other vegetation were swept out of existence in all this field of glacial action, and it is hardly possible that any of their seeds could have survived the thousands of years of glacial winter, while all the more tropical of the species to the southward of the ice field must have been destroyed or driven far toward the equator by the prevailing cold. Then came another geological springtime; the southern limit of the ice field receded and the timber line began gradually creeping after it. The northern tree limits of Canada still conform somewhat to the old parallels of glacial action. It is not strange, therefore, that of the great variety of tree species that flourished on the continent during the warm Tertiary ages only a comparatively few of the hardier ones should have survived; and some of our modern species have probably originated or evolved from older forms since the glacial age, which is variously estimated as having been from 20,000 to 40,000 years ago. It is believed that the receding glaciers left the Falls of Niagara near where the city of Lewiston now stands, and that they have since then cut the river gorge back to their present location.

Another geological influence upon tree distribution may be found in the presence of great barriers which prevent or retard migration. Such wide river valleys as that of the Mississippi undoubtedly have such an influence. Mountain ranges may act in the same manner, and the Rocky Mountains in particular seem to have had a marked influence. There are found in the region west of the Rocky Mountain ranges sixty-two species of coniferæ which do not grow at all in other portions of the continent; twenty-seven species indigenous to the eastern portion of the continent do not grow in the Rocky Mountain region, while only two species may be classified as common to both sections. One of these is the common or dwarf juniper, and the other the white spruce, whose far western habitat is chiefly in the Canadian Rockies. On the other hand 185 hardwood species of the eastern United States are not found on the Pacific slope at all, though ninety-three other deciduous species have their exclusive habitat in that region. This preponderance of the East over the West in the variety of hardwoods would appear greater but for

the exclusion from the above figures of ninety-four species of a tropical character which are found only in the southern Florida lowlands or along the Mexican frontier. But thirteen species of hardwoods may be considered as indigenous on both sides of this barrier line, and some of these show a much wider distribution upon one side than upon the other. Of these thirteen species five are willows; the other eight are the aspen (*Populus tremuloides*), one of the most widely distributed of American trees, and the allied species of *Populus balsamifera* or balm of Gilead; the paper birch (*Betula papyrifera*), which grows on the Pacific Coast no farther south than the vicinity of Seattle, Washington; the live oak (*Quercus virginiana*), a subtropical species which extends from Mexico north along the Atlantic Coast to Virginia and along the Pacific Coast to southern California; the hackberry (*Celtis occidentalis*); the elderleaf mountain ash (*Pyrus sambucifolia*); the longspine haw (*Crataegus macracantha*), which reaches west only to the eastern slopes of the Cascade Mountains; and the box elder (*Acer negundo*).³ It will be seen that few, if any, of the species common on both sides of the Rocky Mountains have any particular commercial importance. This difference in floras is the more remarkable because no such difference exists in any other two areas of the continent having practically the same conditions of soil and climate. The reasons for this great differentiation are obscure and must be looked for largely in the geological past.

PRESENT INFLUENCES AFFECTING TREE DISTRIBUTION.

With what has already been said regarding geological influences the diagram upon page 14 may now be considered as though it related entirely to present conditions. The internal conditions have to do only with the ability of the individual species to make the most of its opportunities; the influences grouped as external embrace all those which are usually given consideration, and these have been divided into general and local; the former including those climatic conditions which are prevalent over wide areas and which would tend to the formation of homogeneous forest growth throughout their sphere of influence; and the latter including the influences at work in more restricted areas and which produce widely varying forest formations under the same general or climatic conditions.

General Influences.—The climatic influences are largely the product

³ These compilations have as a basis the tree species and ranges of distribution as given in the "Check List of the Forest Trees of the United States," by George B. Sudworth, dendrologist of the United States Division (now Bureau) of Forestry, 1898.

of latitude, altitude and prevailing winds. The former are coördinate in the production of mean temperature, and sub-Alpine and Alpine vegetation is of much the same type as subarctic and arctic. Upon the isothermal line connecting localities of the same mean annual temperature may, however, exist wide variations of climate in other respects: In the average extremes of temperature during the winter and summer seasons; in the frequency, suddenness and severity of temporary extreme changes of temperature, succession of freezing and thawing weather; in the amount of precipitation and its character and distribution, whether in gentle rainfall or in prevalent violent storms succeeded by periods of drouth; in the humidity of the atmosphere, and in the amount of sunlight. These moisture influences are largely controlled by the prevailing winds, and the clouds which these carry of course govern the proportions of sunshiny and of cloudy weather over the area.

Local Influences.—All these general conditions are, however, largely modified by local influences, while still other local influences affect forest growth directly in other ways than through the climate. The proximity of the ocean has a great effect on climate, which is, however, more marked upon an open coast. The lines bounding the northern limits of the arctic tree species in northern Canada show little or no southern deflection as they approach the shores of Hudson Bay, but in the vicinity of the Labrador Coast they do not come out to the ocean at all except upon the comparatively sheltered shore of Ungava Bay, and sweep southward toward Newfoundland at a greater or less distance from the ocean according to the ability of the species to resist its bleak influence. Inland bodies of water have a profound local influence upon the forests immediately lining their shores, acting as storage reservoirs for heat, modifying extremes of temperature and preventing late spring and early autumn frosts in their immediate neighborhood, supplying moisture through the atmosphere and for short distances through the soil, and also to some extent doubtless influencing precipitation, though rain-bearing clouds usually discharge their contents at some distance from the locality of their origin. In the widespread benefit of this influence their immediate vicinities share.

The topography of the neighboring country also has its influence. There may be neighboring elevations to act as a wind shield if located upon the side from which come the prevailing winds, or if the relative positions of the forest area and of the elevations are reversed they may, if of sufficient height, draw the moisture from the air currents and send

it back again as streamflow through the forest. The influence of the Rocky Mountains in diverting moisture from the treeless plains lying to the eastward, for the benefit of their wooded western slopes, is a conspicuous illustration of this influence, which may be seen in less degree in many other forest formations. The topographical contour of the forest floor also determines the character of its drainage to a considerable extent, though the supply of earth moisture is usually classed with soil influences.

Edaphic or Soil Influences.—That different soils have an important influence upon plant growth is generally recognized. These soils have been formed through long ages of rock erosion, and there has been going on also a much more rapid process of soil sifting and transportation by water movement, building up the rich and fine alluvial soil of the valleys with particles washed down from the upper portions of the watersheds. The most obvious distinction in soils is between the clayey and the sandy kinds, not only in their chemical composition but in their relative capacities for mechanically entrapping and holding moisture, and for yielding it up again on demand to the capillary rootlets of growing vegetation. Some tree species are quite limited in their soil adaptability, while others will flourish in almost any character of soil if other conditions are congenial.

The character of the original soil has been modified, in both woodland and prairie, by the deposition of decayed or decaying vegetable humus, usually called "leaf mold," though not the leaves only but every part of every plant in time finds its way back again to Mother Earth and becomes partially predigested food for future plant generations. Such a deposit of vegetable humus of course favors the advent of new species suited to such a soil, though not so well adapted as the primitive types to extract their nourishment from the cruder chemical constituents of purely rock soils. As this leaf mold is a vegetable product, however, it forms a sort of connecting link between the soil influences and those to be considered in the next paragraph.

Biotic Influences.—In systematic botany all the influences exerted upon the plant or plant group by other vegetable or animal life or matter are known as biotic, and this somewhat formidable title includes some of the most interesting subjects to be considered in the study of tree growth. It involves the relation of the tree to the tree-society of which it forms a part, and indeed—as has already been explained—to all the trees or other plants which have occupied the ground before it

and, dying, helped to enrich the soil upon which it feeds.³ When we come to look into these relations we shall find the forces at work are closely allied to those which govern human society. There is the same fight for existence or for supremacy, the same racial clannishness shown in the tendency of certain species to gather into groups, while other tree individuals incline toward solitude rather than companionship. The trees have their helpful as well as their antagonistic relationships also, and contribute somewhat to a common defense, so that different forest formations will be found to differ in their powers of resistance to such common foes as fire and windstorms. Different species also have curious inter-relationships; some are not favored in infancy by the prevalence of their own kind, but do best under forest cover of alien growth, which they often ungratefully crowd out of existence when they reach their own lusty prime. In short, the student of trees will find individual and racial character as sharply defined as among mankind, and probably more widely differentiated. The subject is a most inviting one, but it can not be discussed here any farther than it relates to the forest as a whole and to the distribution of species.

Forested and Nonforested Areas.—In the contest of different tree species to occupy the same ground, where the opposing forces are evenly matched the firstcomer, of course, has the advantage. Dense forests now occupy most of the northern half of the continent which was stripped of all vegetation by the glaciers. These forests must have marched up slowly from the south, and upon the frontier of tree progress were the kinds which possessed the greatest facilities for migration by means of seed distribution, in addition to general adaptability to growth in the open. When these began to shade the ground others crept after them which required shade cover for their early growth, and in this way the northward march proceeded, until the different species reached the northernmost limits where they could exist and reproduce—if all the species have reached such limits, it being a question whether they are not still slowly extending northward, the rate of progress of

³The lichens especially have played an important part in soil formation, as they possess the power to feed upon and decompose rock. This peculiar qualification was almost a necessity of their existence when they first appeared upon the earth, before the higher forms of vegetation, for there was then little but rock for them to feed upon; and ever since they have had a part in rock erosion, together with the forces of sunlight, wind, water, frost and the carbonic acid gas of the atmosphere. Decaying vegetable humus is, however, the most profound biotic influence in its reaction upon rocks and rock soils, by charging the waters which pass through it with carbonic acid gas and thereby increasing many fold their solvent action. This corrosive action extends underground as far as these waters penetrate, while the atmosphere corrodes only the surface rocks. A considerable portion of the earth elements thus taken into solution are carried down to the sea and feed the entire series of living forms which inhabit it; so that the forests in this way feed the whales and seals as surely as those animals which inhabit its own domain.

course becoming slower and slower as the northern limit is approached.^{3a} By a somewhat similar process the timber line is advancing to occupy any favorable open area which may have been created in any way, such as by the abandonment of farm land, or the creation of cut-over or burned-over areas where forest had previously existed. In the two latter instances, however, very rarely is the denudation so complete that there does not remain over all the area the germ of the new forest in seeds, roots and partly live stumps.

There is a popular belief that most of the area which is now open prairie was quite recently the site of forests which have been destroyed by fire or other causes. Some prairie land may have been created in this way, and tree growth upon some of the prairies undoubtedly is prevented by the prevalence of prairie fires; but it is altogether unfair to the fire fiend to charge all the treeless areas against his account, nor even all but the more obviously desert sections where moisture is lacking to support plant life. Very rarely are forest fires sufficiently severe to kill out all tree life, even to the roots in the soil, so that they would not send up fresh sprouts and in time reproduce the forest over the burned area. Wherever forests have stood trees have been blown over by the wind; and wherever this occurs the upturned roots carry a quantity of earth with them, and, decaying, leave a hummock beside the hollow formed by the upheaval of the roots. It takes hundreds of years on level ground for these characteristic irregularities to disappear entirely in the surface level, and wherever they are not to be found it is safe to assume that forests have not existed there within such a period.

Still another argument against the fire theory is found in the fact that fires seem to be a regular feature of the usual cycle of forest growth, at least in all forests where coniferous trees predominate. Doctor Robert Bell, of the Geological Survey of Canada, insists upon this point and says that when conditions are ripe for a fire it is often set by lightning instead of by any human agency. After a vivid description of a Canadian forest fire⁴ he furnishes the following account of the growth of the new forest, which will in a general way apply to the northern United States as well, except that there forest growth is more

^{3a} Prof. Shaler (*Aspects of the Earth*, 285) also points out that in the pre-glacial southward migration the trees could not choose their own rate of progress before the advancing ice. "The individual forms, of course, are not free to move, but the succession of generations must win their way southward with sufficient speed to keep ahead of the oncoming ice. If any species failed in this work it would inevitably be overwhelmed by the glacier, and thus disappear from the face of the earth."

⁴ "The Geographical Distribution of Forest Trees in Canada," *Scottish Geographical Magazine*, June, 1897, pp. 281-296.

rapid than farther north and the successive stages follow each other at somewhat shorter intervals than he gives:

The dead trunks of the larger trees generally stand for many years after a fire. In the summer following one of these conflagrations the blackened ground becomes partly covered by a growth of herbaceous plants, berry bushes and shoots from the roots and butts of deciduous trees which have retained some vitality, besides numerous small seedling trees. The huckleberry bushes, which are very common for the first few years, especially on rocky silicious ground, bear abundant crops of fruit. They have sprung from large old roots which are almost everywhere present in the thick woods, although their tops are quite inconspicuous and bear few or no berries. In fifteen or twenty years the ground is covered with poplars, birches, willows, etc., to the height of about thirty feet. By this time the dead trunks of the old *brule* have lost most of their branches and the smaller ones have fallen down. If we look under this growth we shall discover many healthy young coniferæ overshadowed by the more rapidly growing deciduous trees. At the end of about fifty years the coniferæ are everywhere showing their heads in the form of sharp apices, their dark green color contrasting strongly with the lighter shade of the other trees. In the race to get above the deciduous growth they develop tall trunks with the branches high up. In one hundred years the poplars are dying and falling down and the canoe birch has attained maturity and soon after shows signs of old age. In the meantime the older coniferæ have overtopped the older trees and given a new character to the general appearance of the forest. The younger coniferæ of various ages which have been springing up from seed every year, take possession of the ground left by the decay of the first occupants. In about one hundred and fifty years the forest has again become almost entirely coniferous and is ready to be destroyed once more by fire. Such is the rotation of crops of trees which is perpetually going on in these regions. Perhaps one-third of the whole area consists of "second growth" of less than fifty years, one-third of trees from fifty to one hundred years old, while the remaining one-third may be one hundred years old and upward.

The above, of course, applies only to those northern forests where the coniferæ tend eventually to predominate. Many deciduous forests are not subject to fire except in very dry seasons, or perhaps in the fall after the foliage has fallen; and the mature southern pines are little subject to injury from fire because of their height and the protection of their trunks afforded by a thick bark, while the fire runs close to the ground and finds little to feed upon.

Among the biotic influences must be mentioned the activities of living insects, animals, and the animal man. Many forest trees depend upon bees and other insects for flower fertilization, some of them, like basswood and honey locust, being notable honey-producers; others pollinize so profusely that the winds can be relied upon to distribute the pollen. The office of birds and quadrupeds in carrying edible seeds

from place to place is well understood. The squirrel is notably diligent in this regard and buries his food stores in the earth, where they may grow if he fall a victim to predatory appetite before he himself eats his buried store of food. Some seeds like those of the burdock have organs of attachment by means of which they may secure transportation by passing animals, but it is not now recalled that any tree seeds are so strongly specialized in this way.

Forest trees have insect enemies as well as insect friends, and sometimes there are great invasions of insect pests attacking certain species, such as the pine in the Black Hills region of South Dakota a few years ago, and the larches of Canada about 1896. Last and most potent of the animal agencies is that of man himself; and it is his relation to the forest that forms the main theme of the present work.

COMMERCIAL TREE SPECIES OF AMERICA.

George B. Sudworth, accepted in this work as authority on the forest tree species of the United States,⁵ gives 510 distinct species,⁶ not counting hybrids nor species variations, some of the latter of which would rank almost as distinct species. The following table will show the botanical classification:

	Number of—		Species.
	Families.	Genera.	
Gymnospermæ (pine and yew families).....	2	15	93
Monocotyledones (palm and yucca families).....	3	15	15
Dicotyledones (all hardwood trees).....	55	146	402
Totals.....	60	176	510

Of these sixty families eighteen are represented in the United States only in the southern portion of Florida or along the Mexican boundary, being tropical plants and not characteristic of the flora of the country as a whole. These families include thirty-one genera and forty-two species, and there are sixty-four species in other families which might also be classified as tropical, making a total of 106 tropical species. There are seventeen species which were not originally indigenous to this country but are now found growing here wild, having escaped from cultivation. Of the remaining species (as has already been stated in discussing the influence of the Rocky Mountains as a botanical barrier), 212 are found only in the eastern and middle United States, 159 are found only on the Pacific slope or in the Rocky Mountains, and sixteen

⁵ See footnote No. 2, page 19.

⁶ Charles S. Sargent, in his monumental work, "The Silva of North America," states (preface to Vol. XIII.) that 585 species are treated. Such differences arise chiefly in two ways—first, from some botanists considering as distinct species trees which others consider as mere varieties; second, from differences of judgment as to whether certain species are trees or shrubs. In addition is the frequent discovery and identification of new species.

species are common to both geographical divisions. Canada is not known to have any tree species not in Sudworth's list, and her flora comprises only 127 of the 510 species listed by him.

THE COMMERCIALY VALUABLE WOODS.

When we come to consider the woods which are of commercial importance the list becomes restricted to such an extent that room may be made for it here. Many other woods than those given have local uses or are valuable for other purposes than for lumber, but this list includes practically all the woods which furnish sawlogs, and a few besides, on account of their wide distribution. Sudworth's list is followed throughout in giving the range, except where otherwise stated:

*Pinus*⁷ *strobus*. White pine. Its range includes Newfoundland, southern and western Quebec, Ontario (except the far northern portion), southeastern Manitoba near Lake Winnipeg, northern and eastern Minnesota, practically all Wisconsin and Michigan, northern Illinois, northeastern Ohio, south along the Allegheny Mountains to northern Georgia, and most of the New England and middle states.

Pinus resinosa.⁸ Norway or red pine. Northern range almost the same as that of white pine. Southern range (from east to west) through Massachusetts, northern Pennsylvania, northeastern Ohio, central Michigan, northern Wisconsin and northeastern Minnesota.

Pinus divaricata. Banksian pine (Canada) or jack pine (United States). Of restricted commercial importance, but interesting because the most northern in habitat. Sudworth gives its range as follows: "New Brunswick to New Hampshire and west through Great Lake and Hudson Bay (southern shores) region to Great Bear Lake, Mackenzie River and Rocky Mountains; south into northern Maine, northern New York, northern Indiana and Illinois and central Minnesota." Bell's timber map⁹ agrees with above in the northern boundary, but gives the southern limits as passing through Lake Superior and touching the United States only in the northern point of Minnesota and the northern peninsula of Michigan, which is obviously incorrect.

Pinus palustris. Longleaf pine. The well known southern longleaf yellow pine. Atlantic Coast region from near Norfolk, Virginia, to Tampa Bay, Florida; west¹⁰ to eastern Texas; north to northeastern Alabama and northwestern Georgia.

⁷ The *Pinus* genus. According to Sargent's *Silva* there are about seventy species, of which one is in the Philippines, twenty-one in the western United States, thirteen in the eastern United States. Only one species grows in the far north; four in the St. Lawrence basin and northern New England; increased to five in the middle Atlantic states, and in the lowlands of the South eight species are found. In Mexico perhaps twelve or fourteen species exist (Vol. XI, p. 2). At least 100 species are believed to have flourished in North America in the Miocene period (Lea, Rept. U. S. Geol. Survey VII, 72, 83, 17, f 25-33). For insects see footnote 40, p. 11 of Vol. XI, Sargent.

⁸ "Only American representative of a peculiar Old World group of pine trees, of which *P. sylvestris* (Scotch pine) is the best known."—*Silva* XI, 68.

⁹ See footnote No. 4, page 23.

¹⁰ "West to the uplands east of the bottoms of the Mississippi River;" in Texas to the Trinity River and to latitude 32 degrees north, and in Louisiana nearly to the northern boundary.—*Silva* XI, 152, 153.

Pinus echinata (*Pinus mitis*, Michx.). Shortleaf pine. The shortleaf yellow pine of the South, though not so closely restricted to the South in its range as is longleaf. Found as far north as Staten Island, New York, and ranges all down the coast to Florida; west to southern Missouri, eastern Indian Territory and northeastern Texas.¹¹ Sudworth does not define its northern limits very closely. Sargent¹² states that it is found in Union and Jackson counties, Illinois, forms large, solid forests in northern Arkansas, Kansas and Missouri and reaches its greatest development in western Louisiana, southern Arkansas and eastern Texas. On the Atlantic Coast known commercially as North Carolina pine.

Pinus taeda. Loblolly pine. Oldfield pine. Range from New Jersey to Florida, west to eastern Texas,¹³ and north into southeastern Indian Territory, Arkansas, and southern border of middle and western Tennessee. Intermixed with either the longleaf or the shortleaf pine. An inferior lumber wood, used somewhat for turpentine,¹⁴ and the characteristic second growth of abandoned fields and other open areas of the South. Is at its best in eastern North Carolina.

Pinus lambertiana. The sugar pine of the Pacific Coast, a valuable lumber wood.¹⁵ Found in the mountain regions from Oregon to California, extending back to the head of the McKinzie and Rogue rivers in the former State and in the latter to the Sierra Nevada, Santa Lucia, San Bernardino and Cuyamaca mountains.

Pinus ponderosa. Bull pine. Known commercially as California white pine and also as western yellow pine.¹⁶ Ranges from South Dakota and British Columbia on the north to western Texas and Mexico throughout the Pacific and Rocky Mountain region. The most generally distributed tree of large commercial importance in the western mountain region.

Pinus monticola. Silver pine. Known commercially as the "western white pine" of Idaho and Montana (with admixture of allied local species). Range from Vancouver Island and southern British Columbia through northern Idaho to northern Montana, having its highest development in these two States;¹⁷ thence southward through Washington and Oregon to Sierra Nevada Mountains in California.

Pinus flexilis. Limber pine. The most valuable lumber wood of central Nevada,

¹¹ Most abundant and attains its largest size west of the Mississippi River. Silva XI, 144.

¹² Silva XI, 145.

¹³ "Fifty years ago the low hills in Bastrop County, central Texas, were covered with forests of *P. taeda*, which also spread into the adjacent counties. Extensive lumbering operations were carried on here, all the towns of the central and western parts of the State before the building of the Texas railroads being constructed from timber cut in these pineries, which, however, are now exhausted as sources of commercial prosperity."—Silva XI, 112, footnote 4. The original large trees of the Pamlico Sound region appear to have been of better quality than either the virgin or second growth of today. The average quality is better west of the Mississippi River, and there it is often mixed in with the other lumber pines. Silva XI, 114.

¹⁴ "Contains large quantities of resin, but it does not flow rapidly when the trees are boxed, and soon hardens on exposure to the weather, and this species is probably not much worked commercially for the production of turpentine."—Silva XI, 114.

¹⁵ Attains its largest size in southwestern Oregon. Silva XI, 29. Is largest of the pines. Silva XI, 30. Grows 200 to 230 feet high, and six or eight, or occasionally ten or twelve, feet in diameter. Silva XI, 27.

¹⁶ A polymorphous species tending to break into distinct varieties in different localities. Silva XI, 81. ¹⁷ Principal lumber tree of eastern Washington and Oregon, of western Montana, Idaho and the Black Hills of South Dakota, and of western Texas, New Mexico and Arizona."—Silva XI, 81.

¹⁷ Sargent is authority for this statement, confirmed by general knowledge and belief.

though knotty and considered inferior to other pines found farther north in its range limits. Ranges in the Rocky Mountain region from Montana to western Texas and New Mexico, and in the mountains of northern Arizona, Utah, Nevada and California.

Larix laricina (*L. americana*)¹⁸ Michx.). Tamarack. Not largely used for lumber except in shipbuilding and for rowboats, but widely used for posts, poles and ties. Range from Newfoundland and Labrador to northern Pennsylvania, northern Indiana, Illinois, central Minnesota; next to spruce the most northern species, extending from Hudson Bay northwest to Great Bear Lake and the mouth of the Mackenzie River.

Larix occidentalis.¹⁹ Western larch. A larger species than the eastern tamarack and a valuable lumber tree.²⁰ Range from southern British Columbia south in the Cascade Mountains to the Columbia River and to western Montana; also found in the Blue Mountains of Washington and Oregon.²¹

*Picea*²² *mariana*²³ (*P. nigra* Link.). Black spruce. A valuable lumber wood, undistinguished in commerce from the white spruce next described, both being manufactured as "spruce." Range from Newfoundland to Hudson Bay and northward to the Mackenzie River; southward in Michigan, Wisconsin, Minnesota, and in the eastern mountains of North Carolina and Tennessee. Both Sargent²⁴ and Bell agree in including in its range the entire Labrador Peninsula except the extreme northern point and the immediate vicinity of the Atlantic Ocean. Upon Bell's timber map of Canada it and white spruce are platted together as having the most northerly limits of any wood, tamarack coming next; and Sargent speaks of it as "forming, especially north of the fiftieth degree of latitude, extensive forests on the watersheds of the principal streams or in cold, wet swamps; then small, stunted, and of little value." Both these spruces are, however, extensively used as pulpwood in much smaller diameters than would be desirable for saw timber.

Picea canadensis (*P. alba* Link.). White spruce. As to commercial uses see remarks under black spruce above. Northern range same as black spruce according to Sudworth and Bell, though they do not agree on the limits, as see above, except that Sudworth gives it as extending to Alaska and the black

¹⁸ Sargent prefers *L. americana*.

¹⁹ "When it has grown under the most favorable conditions, on low, moist soil, at elevations of between 2,000 and 3,000 feet above the sea level, the western larch often arises to the height of 250 feet, with a trunk from six to eight feet in diameter; on poorer soil and exposed mountain slopes it has an average height of about one hundred feet, with a trunk two or three feet in diameter."—Silva XII, 11.

²⁰ Especially for interior finish. Silva XII, 12.

²¹ Its home is in the basin of the upper Columbia River. Silva XII, 12. The great thinness of its bark unfits it to resist fire, and, being a poor seeder, it is becoming reduced in quantity. Silva XII, 13.

²² *Picea*. There are sixteen known species, seven in North America, one of these in the Appalachian Mountains, two in the Rocky Mountains, one on the northwest coast, one extending to Bering Sea in the far north, and one extending from the east to beyond the Rocky Mountains. The spruces are believed to have inhabited Europe during the Miocene period.—Silva XII, 20.

²³ "In the United States it is most common and grows to its largest size in the territory adjacent to the Great Lakes, where, however, it is nowhere abundant, thriving only in the moistest situations and rarely producing trunks a foot in diameter. It is far less abundant than the red spruce in all the Appalachian region, and everywhere east of the Allegheny Mountains . . . is a small and comparatively rare tree. . . . It is probably rarely used, except in Manitoba and Saskatchewan, for other purposes than the manufacture of paper pulp."—Silva XII, 31.

²⁴ Silva XII, 30.

spruce as extending only to the Mackenzie River. Sargent agrees with Bell on its range including Labrador Peninsula to Ungava Bay. Southern range to northern New York, Michigan, Wisconsin, Minnesota, South Dakota, Montana and British Columbia. Sargent also specifically includes Maine²⁵ and northeastern Vermont, as Sudworth does by inference.

Picea engelmanni. Engelmann spruce. Range, northern Arizona and through the Rocky Mountain region to British Columbia. Sargent says that it is largely manufactured into lumber for the construction of buildings and is also extensively used for fuel and charcoal. The wood is very light and stringy, but not soft.

Picea sitchensis. Sitka spruce or tideland spruce. Known also commercially as western white spruce. One of the prominent lumber woods of Washington and Oregon. Range in the Pacific Coast region from Alaska²⁶ to northern California.

Tsuga²⁷ canadensis. Hemlock. Important commercially because of its wide distribution and its especial adaptation for the coarser building materials on account of its strength and durability.²⁸ Range from Nova Scotia westward through southern Quebec and Ontario to Minnesota, through Wisconsin, Michigan and southward along the mountains to northern Alabama and Georgia.

Tsuga caroliniana. Carolina hemlock. A local southern species closely allied to *T. canadensis*, formerly considered a variety of the species, occurring in the same forests and farther south than the range of the *T. canadensis*, and undistinguished commercially.²⁹ Range mountains of southwestern Virginia, western North Carolina, and northern Georgia; very local.

Tsuga heterophylla. Western hemlock. Of larger growth³⁰ than the eastern species and a better lumber wood, though not yet very largely used. Range from Alaska³¹ to Idaho and Montana and southward in the mountains to California.

²⁵ "Occurring very close to the shore, where it is bathed in the spray of the ocean."—Silva XII, 88.

²⁶ In Alaska "occurring at the sea level often to the height of more than a hundred feet, and ascending to elevations of three thousand feet, but decreasing in size as it ascends or leaves the neighborhood of the ocean."—Silva XII, 156. "It is the principal lumber manufactured in Alaska."—Silva XII, 57. "The greatest of all spruce trees, this inhabitant of the northwestern coast is surpassed by few others either in thickness or height of stem."—Silva XII, 57.

²⁷ *Tsuga*. Seven species, confined to temperate North America, and eastern and southern Asia. In North America two species east and two west. Japan, two species, and the seventh in the Himalaya Mountains. Not greatly subject to insects or fungi in this country. Name is the common Japanese name of the tree (*tsuga*).—Silva XII, 60, 61.

²⁸ The use of the bark for tanning should be mentioned. "It is estimated that in the year 1897 1,200,000 tons of bark of this tree were harvested; and although a large part of the timber of the trees, cut and stripped of their bark, is allowed to rot on the ground, it is believed that the average annual value of the material of all kinds obtained from the hemlock is not less than \$30,000,000."—Silva XII, 86, footnote 3. United States census of 1900 reported a product of 473,222 cords valued at \$1,945,452 during the year 1899.

²⁹ Silva XII, 69.

³⁰ "Frequently 200 feet in height, with a tall trunk from six to ten feet in diameter."—Silva XII, 73.

³¹ "where it forms with the tideland spruce the largest part of the great coast forest which extends from the sea level up to elevations of about two thousand feet, sometimes one and sometimes the other predominating."—Silva XII, 74.

*Pseudotsuga*³² *taxifolia* (*P. mucronata*³³ or *P. douglasii* Carr.). Douglas spruce. Also known commercially as red fir, Douglas fir and as Oregon pine. The most important lumber wood of the Pacific Coast.³⁴ Widely distributed³⁵ in the Rocky Mountain region and on the Pacific Coast in the United States and northward into British Columbia. Has its maximum development in Washington and Oregon and on Vancouver Island.

Pseudotsuga macrocarpa.³⁶ Bigcone spruce. Range, southern California (San Bernardino Mountains to the Cuyamaca Mountains).

*Abies*³⁷ *balsamea*. Balsam fir. Given because it is the typical western species, though not used for lumber,³⁸ being, however, employed to some extent for pulpwood. It belongs in the most arctic group of woods, its northern limits through most of their extent reaching within twenty to thirty miles of those of the spruces (see *Picea mariana*). It extends south to Pennsylvania, Michigan and Minnesota, and in the eastern mountains as far south as Virginia. An allied species (*A. fraseri*³⁹) is found only in the Appalachian Mountains.

Abies grandis. Lowland fir, white fir. Known also commercially as the silver fir or great silver fir. Coast region from Vancouver Island to California, and from Washington and Oregon to northern Idaho and Montana.⁴⁰ Manufactured into lumber and used for interior finish, packing cases, cooperage, etc.

Abies concolor. White fir. Oregon to southern California, and northern Arizona and New Mexico to Colorado and Utah. This and *A. grandis* seem to be known together as "white fir" in Oregon, while only *A. grandis* is known in Montana and Idaho, and only *A. concolor* in California, where it reaches its greatest development. Sargent thinks the latter may be only a southern variety of the former, and says it is occasionally manufactured into lumber and used for packing cases, butter tubs and other local purposes.

Abies amabilis. Amabilis or lovely fir. Known also as larch among Oregon lumbermen, and also in Washington, where it is cut and sold with *A. nobilis*.⁴¹

³² *Pseudotsuga*. Three species, two in America and the third in Japan. Not known to be seriously injured in this country by insects or disease.—Silva XII, 84.

³³ Preferred by Sargent.

³⁴ "A tree, when grown under favorable conditions, often 200 feet in height, with a trunk three or four feet in diameter, and frequently much taller, with a trunk ten or twelve feet in diameter." "I have not been able to obtain any reliable information concerning the maximum height of the Douglas spruce. Lumbermen on Puget Sound habitually speak of trees from 300 to 350 feet tall, but their statements unsupported by actual measurements must be accepted cautiously." He goes on to say that the tree often towers over forests which average 200 feet in height, so it must at its maximum be a very tall tree.—Silva XII, 88, and footnote 1. For coarse purposes, railway ties, piles, and for spars and masts is unequalled in strength.—Silva XII, 90.

³⁵ "No other American tree of the first magnitude is so widely distributed, or can now afford so much timber, and the rapidity of its growth and its power of reproduction under favorable conditions make it the most valuable inhabitant of the great coniferous forests of the Northwest."—Silva XII, 81, 92.

³⁶ Is "occasionally manufactured into lumber, and largely used for fuel."—Silva XII, 94.

³⁷ *Abies*. Twenty-three species. In America two occur east, seven west, and two are found only in Mexico and Guatemala. The rest of the species are found in the mountains (chiefly) of Europe, Asia and Africa. Does not suffer severely in America from insects or fungi.

³⁸ "Except to some extent for box lumber."—Silva XII, 109.

³⁹ "Grows thirty to forty, and rarely seventy to eighty feet high, with a trunk occasionally two and one-half feet in diameter."—Silva XII, 105. "Occasionally used for lumber in building mountain hotels."—Silva XII, 106.

⁴⁰ "Does not grow gregariously."—Silva XII, 118.

⁴¹ United States Geological Survey, 1899-1900, Part V, pp. 100-101.

It is ranked seventh among the ten or eleven principal timber trees of Washington, both as to desirable qualities of the wood and as to size, quantity and accessibility of the timber, and constitutes about 3.74 percent of the stand of commercial timber in that State.⁴² Sargent says that it reaches its greatest development on the Olympic Mountains of northwestern Washington.⁴³ Range from the Fraser River region in British Columbia southward in the Cascade Mountains to Washington and Oregon.

Abies nobilis. Noble fir. Known also commercially as larch. In Washington and Oregon (in company with the nearly related *A. amabilis*) it constitutes about five percent of the total timber stand.⁴⁴ Found in Washington in the coast mountains in the southwestern part of the State; in the Olympic Mountains on Soleduck River; and from Mount Baker southward in the Cascade Mountains, to Oregon, as far as headwaters of McKinzie River in Lane County.

Abies magnifica.⁴⁵ Red fir. Range California (Mount Shasta and along the western slopes of Sierra Nevada Mountains).

*Sequoia*⁴⁶ *washingtoniana* (*S. gigantea* Decaisne, *S. wellingtonia* Seeman). Big-tree. A characteristic species, though not much used for lumber, except locally, on account of its large size and consequent difficulty of manufacture.⁴⁷ Range in California from latitude 39 degrees north to a little south of latitude 36 degrees north, or from the middle fork of the American River and along the western slopes of the Sierra Nevada Mountains to the headwaters of Deer Creek.

Sequoia sempervirens.⁴⁸ Redwood. Range from the southern borders of Oregon and southward in the coast region, twenty to thirty miles inland, through California to Salmon Creek canyon. Largest bodies are found in Humboldt, Mendocino and Del Norte counties, California.

*Thuja*⁴⁹ *occidentalis*. Arborvitæ. Known commercially as white cedar. Not used so much for lumber as for posts, poles and shingles. Sudworth lists forty-six cultivated varieties of this species. Indigenous range from New Brunswick to Lake Winnipeg and south to central Minnesota and Michigan, northern Illinois and in the Atlantic Coast region along the mountains to North Carolina and eastern Tennessee.

Thuja plicata.⁵⁰ Giant arborvitæ. Known commercially as (western, or Washington) red cedar. Forms about five percent of the stand of western timber

⁴² United States Geological Survey, 1899-1900, Part V, p. 127.

⁴³ Silva XII, 126.

⁴⁴ "Occasionally manufactured into lumber, it is used under the name of larch for the interior finish of buildings, and for packing cases."—Silva XII, 135.

⁴⁵ "In California is occasionally manufactured into coarse lumber employed in the construction of cheap buildings, and for packing cases."—Silva XII, 139.

⁴⁶ The genus *Sequoia* was named after Sequoyah (George Guess), the half-breed inventor of the Cherokee alphabet.

⁴⁷ "The most massive stem, though not the tallest tree, in the world."—Silva X, 146.

⁴⁸ "The most valuable timber tree of the forests of Pacific North America."—Silva X, 142 See Muir, "Mountains of California," p. 195.

⁴⁹ *Thuja* (*Thuya* Sargent). Four species. One, the type of the genus, in northeastern North America; one in northwestern North America. One in the mountains of central Japan, and the fourth in China. The type is ancient and was widely distributed in the Tertiary ages through both hemispheres. Not injured seriously by insects or fungi. Silva X, 124.

⁵⁰ *T. gigantea* (Nuttall) preferred by Sargent.

woods. Range from coast of southern Alaska to northern California; eastward through British Columbia and northern Washington to northern Idaho and Montana, and along the western slopes of the Rocky Mountains.⁵¹

*Libocedrus*⁵² *decurrens*. Incense cedar. Known also commercially as white cedar. Range from Oregon southward on the western slopes of the Cascade Mountains through California, Lower California and western Nevada.

*Taxodium*⁵³ *distichum*. Bald cypress. Known commercially simply as "cypress," though no true cypress (*Cupressus*) of commercial value exists in this country. Range in the Atlantic Coast region from southern Delaware to Florida, westward along the Gulf Coast to Texas, and northward from the Gulf Coast through Louisiana, Arkansas and eastern Mississippi and Tennessee, southeastern Missouri, western and northwestern Kentucky, southern Illinois and southwestern Indiana. Reaches its highest development in the bayou district of Louisiana and in similar regions of deep alluvial deposits along the Gulf and Atlantic coasts.

*Juniperus*⁵⁴ *virginiana*. Red juniper. Known commercially as pencil cedar or as red cedar. Of slight importance because of limited supply, being sparsely distributed over a wide⁵⁵ area. Range from Nova Scotia and New Brunswick to Florida,⁵⁶ west in Ontario to Dakota, central Nebraska and Kansas, and Indian Territory. *J. barbadensis*, pencil cedar, is by Sudworth considered a distinct species.

*Juglans*⁵⁷ *cinerea*. Butternut. Of considerable use for interior finish, furniture, etc. Range from southern New Brunswick to Delaware, and on the Appalachian Mountains to Georgia and Alabama; westward through Ontario to Dakota, southeastern Nebraska, southern Missouri, and northeastern Arkansas.

Juglans nigra. Black walnut. The most valuable native cabinet wood, but now

⁵¹ "The noblest of its race, and one of the most valuable timber trees of northwestern America, *T. gigantea* is rapidly disappearing with the spread of forest fires, which, burning through their thin bark, soon kill these trees."—Silva X, 130.

⁵² *Libocedrus*. "Eight species of *Libocedrus* (which is, perhaps, too closely connected with the *Thuja* to be considered generically distinct) are now distinguished; one is widely scattered through the mountain forests of western North America; two inhabit western South America, where they are distributed from Chili to Patagonia; two occur in New Zealand, two in New Caledonia, and one in southwestern China." Species closely analogous to the present North American inhabited Greenland in the Cretaceous period.—Silva X, 134.

⁵³ *Taxodium*. Two species, one in the United States and one in the Mexican highlands. Not seriously injured by pests or fungi.—Silva X, 150. "Dry rot in living timber often diminishes its value and in Louisiana and Mississippi is said to affect at least one-third of all the trees" (Dickson and Brown, Am. Jour. Sci., Ser. 2, Vol. 15, on 'The Cypress Trees of Mississippi and Louisiana').—Silva X, 150, footnote 5. Nevertheless its products show great resistance to rot.

⁵⁴ Gin is flavored with the crushed berries of *J. communis*. This species might be included as a characteristic one on account of being one of the very few that may be said to be transcontinental in habit. *J. monosperma* is much used for fencing and fuel, according to Silva X, 90. Its range is eastern base Rocky Mountains of Colorado (Platte and Arkansas Rivers) and southward into western Texas; southern Utah to central New Mexico and Arizona.

⁵⁵ "The most widely distributed coniferous tree of North America."—Silva X, 94.

⁵⁶ "In western Louisiana, Texas, and southern Arkansas, it attains its greatest dimensions on rich alluvial bottom lands, and in Kansas and eastern central Nebraska grows usually on dry limestone river bluffs, where, before the coming of white men, it often formed groves of considerable extent."—Silva X, 94, 95. "The straightest grained and most easily worked cedar wood is obtained from the swamps near the western coast of the Florida Peninsula, and large factories have been established at Cedar Keys, Florida, and at other points in the southern states, by German manufacturers, to cut up the wood for pencil making."—Silva X, 95, footnote 3.

⁵⁷ *Juglans*. Ten species now known, two in North America generally, and a third in western Texas, Mexico, etc., one or two additional species in Mexico, one in western California. One in the Antilles, and perhaps one or two others in South America. One in Europe, one in northern China, one in Japan.

scarce. Range from southern Ontario to Florida, central Alabama and Mississippi, and westward through southern Michigan, Wisconsin and Minnesota to Nebraska, Kansas and Texas.

*Hicoria*⁵⁸ *alba*. Mocker nut, American white hickory.

Hicoria minima. Bitternut or swamp hickory.

Hicoria ovata. Shagbark.

Hicoria glabra.⁵⁹ Pignut.

All four of the above are known indiscriminately as lumber woods under the name of "hickory." All have practically the same range, from Quebec and Ontario to Florida along the Appalachian Mountains, and west to Nebraska, Kansas, Indian Territory and Texas.

*Populus*⁶⁰ *tremuloides*. Aspen. The most widely distributed American tree, but of no particular commercial value, though used for pulpwood and to some extent in turnery.⁶¹ Ranging from Newfoundland through the central Labrador Peninsula to Hudson Bay, and northwestward to the mouth of the Mackenzie River and to Alaska; southward to the mountains of Pennsylvania, and to Missouri, southern Nebraska, and generally through the western mountains to New Mexico, lower California and into Mexico.

Populus balsamifera. Balm of Gilead. Not of much commercial importance,⁶² but one of the few trees which are of transcontinental distribution. In the extent of its northern limits it is exceeded only⁶³ by American larch and the black and white spruces. Its range includes Newfoundland, nearly all the Labrador Peninsula, and from the western shore of Hudson Bay northwestward to the mouth of the Mackenzie River and the Alaska coast, southward

⁵⁸ "*Hicoria* is confined to the temperate regions of eastern North America, distributed from the St. Lawrence to the Mexico highlands, where one endemic species occurs. Nine species are known, eight of which inhabit the territory of the United States, the headquarters of the genus, as represented by the greatest number of species, being in southern Arkansas. Traces of hickory have been found in the Tertiary rocks of Greenland; paleontologists have described numerous species in the Upper Tertiary formation of Europe, and there are evidences that it once ranged in North America far to the westward of its present home."—Silva VII, 132.

⁵⁹ "Extremely common in all the northern states . . . in Missouri and Arkansas it is, perhaps, the commonest species . . . and it probably attains its largest size in the basin of the lower Ohio River. . . . Commercially is not distinguished from the wood of the shellbark hickory."—Silva VII, 167.

⁶⁰ *Populus*. Temperate and boreal regions in the northern hemisphere. One endemic species in Lower California, two in the Himalayas. "Of the eighteen or nineteen species (f. 5. Many hybrids occur) which have been distinguished, nine inhabit British Columbia and the United States, where poplars are distributed from within the Arctic Circle to Mexico, and from the shores of the Atlantic Ocean to those of the Pacific. In the eastern hemisphere poplars extend north to the Arctic Circle and abound in northern and central Europe and in northern and central Asia, where they are often the most conspicuous feature of the vegetation."—Silva IX, 152. "*Populus* is the oldest type of dicotyledonous plants yet identified, and its traces, with those of the sequoias, pines and cycads, have been found in the Lower Cretaceous rocks of Greenland. It was common on the midcontinental plateau of North America during Cretaceous times, and in Europe and North America during the Tertiary epoch, and predominated in the Miocene of Europe, the remains of twenty-eight species of that period having been described."—Silva IX, 153. "The most valuable timber trees of the genus being the North American *P. deltoides* (*deltoides* Sudworth), *P. heterophylla* and *P. trichocarpa*."—Silva IX, 155, 156. Range of *P. heterophylla* is from Connecticut and Long Island southward near the coast to southern Georgia; westward in the Gulf region to western Louisiana and through Arkansas to southeastern Missouri, western Kentucky, and Tennessee, and southern Illinois and Indiana.

⁶¹ "And sometimes for flooring."—Silva IX, 159. "Valuable as a cover tree for other young seedlings."—Silva IX, 160.

⁶² "Often 100 feet in height, with a tall trunk six or seven feet in diameter."—Silva IX, 167. "It is made into paper pulp, and in northern Michigan is manufactured into palls, tobacco boxes and small packing cases."—Silva IX, 167.

⁶³ According to Dr. Robert Bell.

to New England and New York, central Michigan and Minnesota, Dakota, northwestern Nebraska, and northern Montana, Idaho, Oregon and Nevada. *Populus deltoides* (*Populus monilifera* Aiton). Cottonwood. The generally known cottonwood of commerce, although a Pacific Coast species (*P. trichocarpa*⁶⁴) is largely used locally for slack cooperage and woodenware. The range of *deltoides* is from Quebec and Vermont through western New England and New York, Pennsylvania, Maryland and the Atlantic Coast states to western Florida, and west to the Rocky Mountains from southern Alberta to northern New Mexico. It is, however, only in the South that it grows large enough and plentiful enough to be prominent as a lumber wood—particularly in the lowlands of the Mississippi Valley from Illinois south.

*Betula*⁶⁵ *papyrifera*.⁶⁶ Paper birch. Known largely in Canada as canoe birch from the use of its bark in making canoes. Not prominent as a saw timber, though largely used in turnery, in the manufacture of shoe lasts and pegs, spools and other small articles. It and the aspen (*Populus tremuloides*) grow the farthest north of the deciduous woods, the range including the Labrador Peninsula to Ungava Bay, except a narrow strip along the open coast, across to Hudson Bay, and northwest to the mouth of the Mackenzie River, Yukon River and the Alaska coast; southward to New York and northern Pennsylvania, central Michigan and Minnesota, northern Nebraska, Dakota to the Black Hills region, northern Montana, and northwestern Washington, near Seattle.

Betula lutea.⁶⁷ Yellow birch. Probably the most plentiful lumber birch, though the red or river birch (*B. nigra*⁶⁸) and the sweet birch, next to be described, are also used.⁶⁹ The yellow birch ranges from Newfoundland along the northern shores of the Gulf of St. Lawrence to Abbitibbe Lake and Rainy River;

⁶⁴ *P. trichocarpa*. Black cottonwood, balsam cottonwood. "A tree often nearly two hundred feet in height, with a trunk seven or eight feet in diameter."—Silva IX, 175. "In Oregon and Washington, where the demand for the wood has already caused the destruction of most of the old trees, it has been largely made into the staves of sugar barrels, and it is also used in the manufacture of woodenware pallets and butter-tubs, although its bitter taste lessens its value for these purposes."—Silva IX, 176. "In western British Columbia, Washington and Oregon it abounds in all the river valleys, and is the largest of the broad-leaved trees."—Ibid.

⁶⁵ *Betula*. "About twenty-four species may be distinguished. Nine occur in North America; of these six are trees and three are low shrubs. Six or seven species inhabit Europe, the most important, *B. alba*, also ranging in several forms through Siberia to Japan. The type is an ancient one; its traces appear in the Cretaceous rocks of the Dakota group formation, and later, during the Tertiary period, it spread over the central plateau and the northwest coast of North America, and abounded in Europe, where paleontologists have recognized in the Eocene, Pliocene and especially in the Miocene the remains of numerous species, the direct ancestors of those now living."—Silva IX, 46, 47, 48.

⁶⁶ "A tree, usually sixty or seventy, or, on the northwest coast, occasionally 120 feet tall, with a trunk from two to three feet in diameter."—Silva IX, 57. "West of the Rocky Mountains, where it attains its largest size, the canoe birch usually grows singly, and is found only along the banks of streams." "Preferred for making spools."—Silva IX, 59.

⁶⁷ "A tree occasionally 100 feet high, with a trunk three or four feet in diameter; or, in the neighborhood of the coast or toward the southern and the extreme northwestern limits of its range, much smaller, and often not more than twenty or thirty feet in height."—Silva IX, 53. "One of the largest deciduous-leaved trees of the northern forests of northeastern North America. . . . Is exceedingly abundant; and attains its largest size in the eastern provinces of Canada, and in northern New England and New York."—Silva IX, 54.

⁶⁸ *Betula nigra*. "Eighty or ninety feet in height, sometimes five feet in diameter."—Silva IX, 61. Used for furniture, woodenware, wooden shoes and in turnery. "It is one of the most interesting trees of this genus. It is the only semiaquatic birch, and its seeds . . . ripen in early summer when the water of swamps is usually at its lowest level, and, falling on the damp, rich soil of their exposed banks, germinate at once and produce plants which obtain a firm foothold and grow to be several inches high before the autumn. . . . Other birches inhabit cold northern countries or high mountains in warmer regions; but the river birch flourishes and attains its largest size in the damp, semitropical lowlands of Florida, Louisiana and eastern Texas."—Silva IX, 62-63.

⁶⁹ Also *B. populifolia*, which, "while the smallest and least widely distributed of the birch

southward to northern Minnesota, and through the northern states to eastern Tennessee, North Carolina and Delaware.

Betula lenta.⁷⁰ Sweet birch. Known also commercially as black birch or cherry birch, and in Minnesota as river birch. Range much the same northward as the yellow birch; in the South reaching southern Indiana and Illinois, and along the Allegheny Mountains to central Kentucky, Tennessee and western Florida. Used to some extent for furniture.⁷¹

Ostrya virginiana.⁷² Hornbeam. Both this and blue beech (*Carpinus caroliniana*) are largely known as ironwood, and have some use for tool handles, levers and other purposes requiring a very strong, hard wood. Of little commercial importance. Range from Quebec and Ontario south to northern Florida and west to eastern Kansas.

Fagus ⁷⁴*atropunicea* (*F. ferruginea* Alton).⁷⁶ Beech. Range Nova Scotia to Lake Huron and northern Wisconsin; south to western Florida, and west to south-eastern Missouri and Texas.

Castanea ⁷⁷*dentata*.⁷⁸ Chestnut. Range from southern Maine to northwestern Vermont, southern Ontario and southeastern Michigan; southward to Delaware and southeastern Indiana, and on the Allegheny Mountains to central Kentucky and Tennessee, central Alabama, and Mississippi.⁷⁹

Quercus ⁸⁰*alba*. The true white oak. Commercially other varieties are known in-

trees of eastern North America, is largely used in the manufacture of spools, shoe pegs, wood pulp and for the hubs of wheels. It makes excellent fuel."—Silva IX, 56.

⁷⁰ "A tree seventy or eighty feet in height, with a trunk from two to five feet in diameter."—Silva IX, 50.

⁷¹ "It is largely used in the manufacture of furniture, and for fuel, and in the Maritime Provinces of Canada in ship and boat building."—Silva IX, 50.

⁷² *Ostrya*. "Four species now known, two in north central America, one of them being widely distributed, the other in Arizona, one in southern Europe and western Asia, and the fourth in northern Japan. In Eocene and Miocene Europe ranging as far north as Greenland."—Silva IX, 32.

⁷³ "Occasionally fifty or sixty feet in height, with a trunk two feet in diameter. . . . Grows to its largest size in southern Arkansas and the adjacent parts of Texas."—Silva IX, 84, 36.

⁷⁴ *Fagus*. Fifteen or sixteen species. One eastern America; one Europe, western Asia, and China, and Japan; three are endemic to Australia, four are found in New Zealand, five in southern Chili and Tierra del Fuego. The type is ancient.—Silva IX, 22.

⁷⁵ "A tree, usually seventy or eighty, or under exceptionally favorable conditions occasionally 120 feet in height, with a trunk three or four feet in diameter."—Silva IX, 27. "*F. americana*, though less common than several oaks, is one of the most widely distributed trees of eastern North America, inhabiting the rich soil of valleys and mountain slopes, where it often forms nearly pure forests of considerable extent, and sometimes at the South the bottom lands of streams and the margins of swamps." "It is in the lower Ohio Valley, the southern Allegheny Mountains, and banks of the lower Mississippi, where, associated with the evergreen magnolia, it grows to great perfection. . . . Largely used in the manufacture of chairs, shoe lasts, plane stocks and the handles of tools."—Silva IX, 28, 29.

⁷⁶ Sargent prefers *F. americana* Sweet.

⁷⁷ *Castanea*. Four species, the type species being *C. castanea*, which in various forms inhabits Europe, Africa and Asia. The three other species are known to the eastern United States, two of them trees, and the third a shrub. Existed before the Middle Tertiary in northern Greenland and Alaska, in the Miocene of Oregon and the Upper Miocene of Colorado. Existed in Europe in the Cretaceous period.—Silva IX, 8, 9, 10.

⁷⁸ "Occasionally 100 feet high in the forest, with a tall, straight, columnar trunk three or four feet in diameter, or often when uncrowded by other trees develops a short trunk which in some exceptional individuals attains a diameter of ten or twelve feet."—Silva IX, 13. "Largely used in the manufacture of cheap furniture and in the interior finish of houses, and for railway ties, fence posts and rails, its durability, owing to the large amount of tannic acid which it contains, being its most valuable quality."—Silva IX, 14.

⁷⁹ "Except at the north it does not range far beyond the Appalachian hills, upon which in western North Carolina and eastern Tennessee it attains its noblest dimensions."—Silva IX, 14.

⁸⁰ *Quercus*. "Nearly three hundred species [of oaks] have been described. Inhabitants of the temperate regions, they occur also at high altitudes within the tropics, ranging south to the moun-

discriminately as white oak, among them *Q. lyrata*,⁸¹ common through the South; *Q. platanooides*⁸² (*Q. bicolor* Willdenow), ranging from Maine and northwestern Quebec to southeastern Iowa and western Missouri, northern Kentucky and Arkansas, and along the Appalachian Mountains to northern Georgia; *Q. michauxii*,⁸³ from Delaware and southern Indiana southeast; *Q. brevifolia*⁸⁴ (*Q. durandii* Buckley), Alabama to Texas, and according to Sargent the most valuable white oak of the latter State; *Q. oblongifolia*,⁸⁵ western Texas, and others.⁸⁶ The far western species most nearly approaching *Q. alba* are *Q. garryana*, the most valuable Pacific Coast white oak,⁸⁷ Vancouver Island and British Columbia southward through Washington and Oregon to California; *Q. douglasii*,⁸⁸ California; *Q. arizonica*,⁸⁹ Arizona and southern New Mexico. *Q. alba* ranges from southern Maine to southwestern Quebec and through central and southern Ontario, the lower peninsula of

tains of Colombia in the New World, and in those of the Indian Archipelago in the Old World, a few degrees south of the Equator, they find their most southern home. The genus has no representative in central and southern Africa, in South America beyond Colombia, or in the islands of the Pacific, in New Guinea or in Australia. The great centers of distribution are the highlands of Central America and Mexico, and the Indian Archipelago and Malaysia, whence it ranges to the Philippine Islands and to Asia and Japan. In North America, exclusive of Mexico, fifty species are distinguished. With four exceptions they all under favorable conditions sometimes assume the habit of trees. In both the eastern and extreme western part of the country [United States] *Quercus* is oftentimes the conspicuous feature of the vegetation. In eastern America at the extreme northern limits is represented by a single species. The number greatly increases south, and in New England ten grow. In the south Atlantic and gulf states the number is increased to nineteen, the greatest aggregation of species, though in the Mississippi Valley the oak trees are more abundant and grow to larger size than in any other part of North America. In the West reaching British Columbia and Washington with but a single species, the number increases southward, five species occurring in southern Oregon and thirteen grow in California. The type is an early one."—Silva VIII, 2, 3. Commercially all the oaks that furnish material for the sawmill are roughly divided into two classes—the white oaks and the red oaks. A ready method of distinguishing them is by the leaf. Those classed as white oaks, generally have lobes with rounded extremities, while the lobes of the red oaks terminate in a sharp point or even in a thorny process.

⁸¹"A tree, usually 100 feet in height, with a trunk from two to three feet in diameter."—Silva VIII, 47. "It is most common and grows to its largest size in the valley of the Red River in Louisiana and the adjacent parts of Texas and Arkansas; and in southern Illinois, on the swampy bottom lands, it is the prevalent species of the forest."—Silva VIII, 48.

⁸²"A tree, usually sixty or seventy, or occasionally 100 feet in height, with a trunk two or three or occasionally eight or nine feet in diameter."—Silva VIII, 63. "It usually grows in small groves, rarely forming an important part of the forest, and is probably more abundant and of larger size in western New York and northern Ohio than in any other part of the country." "Commercially it is not distinguished from the wood of the *Q. alba* and *Q. macrocarpa*."—Silva VIII, 64.

⁸³"A tree, often 100 feet in height, with a trunk sometimes free of branches for a distance of forty or fifty feet above the ground, and from three to seven feet in diameter."—Silva VIII, 17. "*Q. michauxii* is one of the most important timber trees of eastern North America, and the largest and most valuable white oak of the southeastern states."—Silva VIII, 68. *Q. lyrata*, *Q. platanooides* and *Q. michauxii* are sometimes distinguished from white oak under the name of swamp oak, being differentiated more or less from *Q. alba* under varying conditions of growth.

⁸⁴"A tree, sometimes eighty or ninety feet in height, when growing east of the Mississippi River, with a tall, straight trunk frequently from two to three feet in diameter; in Texas much smaller."—Silva VIII, 71. "When grown in Alabama and Mississippi it is said to equal the best white oak, and to be used for the same purposes as that wood. It is especially valued for the pins in cotton gins, and in the manufacture of spools, baskets and wagon hubs."—Silva VIII, 72.

⁸⁵"Exceedingly difficult to cut and split, it is sometimes used for fuel, but has no other economic value."—Silva VIII, 88.

⁸⁶*Q. acuminata* should perhaps be mentioned with other eastern white oaks. "A tree, from eighty to 100 or occasionally 160 feet in height, with a tall, straight trunk three or four feet in diameter."—Silva VIII, 55. "Probably attains its largest size on the banks of the lower Wabash River and its tributaries in southern Indiana and Illinois."—Silva VIII, 56. "It is largely used in cooperage and the manufacture of wheels, for fencing and for railway ties."—Silva VIII, 56.

⁸⁷"As a timber tree, *Q. garryana* is the most important oak of Pacific North America."—Silva VIII, 30.

⁸⁸"Of little use in construction or the arts, it makes excellent fuel."—Silva VIII, 80.

⁸⁹"Extremely difficult to cut and split, it is only used for fuel."—Silva VIII, 80.

Michigan and southern Minnesota to southeastern Nebraska and eastern Kansas; south to northern Florida and Texas.⁹⁰

Quercus macrocarpa. Bur oak or mossycup oak. Often undistinguished commercially from white oak, though of superior durability in contact with the soil.⁹¹ Range from New Brunswick and Nova Scotia through the St. Lawrence River valley in Ontario to southern Manitoba; from Massachusetts and Pennsylvania west to the eastern slope of the Rocky Mountains in Montana, western Nebraska, central Kansas, and southward into central Tennessee, Indian Territory and Texas.

Quercus minor (*Q. obtusiloba* Michaux). Post oak. Sometimes called white oak in Kentucky and Indiana. Range southern Massachusetts and along the New England Coast region to northern Florida, southern Alabama, and Mississippi; west to Missouri, eastern Kansas, Indian Territory and Texas. Sargent says⁹² it is "the most common and widely distributed oak of the gulf states west of the Mississippi River, forming the principal growth of the Texas 'cross-bottoms.'"

*Quercus virginiana*⁹³ (*Q. virens* Aiton). Live oak. A very strong and durable commercial species⁹⁴ largely used in shipbuilding in the days of wooden ships. From Virginia on islands and near the coast to and through southern Florida, and along the Gulf Coast to western Texas; also in lower California, and extending into Mexico, Central America and Cuba. *Q. agrifolia*,⁹⁵ north-

⁹⁰ "Rarely in Quebec or northern New England, where it is found mixed with the white pine, it is abundant and grows to its largest size in Ontario, frequently forming a considerable part of the forest growth."—Silva VIII, 17. "The most abundant and grows to its greatest height on the western slopes of the Allegheny Mountains in Tennessee and the Carolinas, and on the bottom lands of the lower Ohio basin."—Silva VIII, 18.

⁹¹ "This is one of the largest oaks of North America, rising sometimes to a height of 160 or 170 feet, and forming a trunk six or seven feet in diameter and clear of limbs for seventy or eighty feet above the ground."—Silva VIII, 43. "Common in the lowland forests of the Mississippi basin and in eastern Texas, growing probably to its largest size in southern Indiana and Illinois; it is the common species of the scattered oak forests or 'oak openings' of western Minnesota, where the eastern woodlands are gradually replaced by prairies. . . . It is the most frequent and generally distributed oak of Nebraska. . . . It is the most generally distributed oak of Kansas also."—Silva VIII, 45. "Is one of the most valuable timber trees of North America, its wood being superior in strength even to that of *Q. alba*, with which it is commercially confounded. It is heavy, strong, hard, tough, close grained and very durable in contact with the soil."—Silva VIII, 45.

⁹² "A tree rarely 100 feet in height, with a trunk two or three feet in diameter."—Silva VIII, 37. "In the Mississippi basin it is one of the most common oak trees, on dry, gravelly uplands, where it grows to its largest size; it is the most abundant oak of central Texas, being usually found on limestone hills and sandy plains, and toward the western limits of its range in Texas and the Indian Territory it forms with *Q. marilandica* (black jack) an open forest belt, to which the name of 'cross bottoms' was given by the early travelers and settlers." "It is largely used for fuel, fencing and railway ties, and in some states west of the Mississippi River, especially in Texas, in the manufacture of carriages, for cooperage, and in construction."—Silva VIII, 38.

⁹³ "A tree, forty or fifty feet in height, with a trunk three or four feet in diameter above its swollen or buttressed base."—Silva VIII, 99. "On the Atlantic and east Gulf Coast, where it attains its largest size, the live oak grows on rich hummocks," etc.—Silva VIII, 100.

⁹⁴ "*Q. virginiana* is one of the most valuable timber trees of North America. The wood is very heavy, hard, strong, tough and close grained, with a satiny surface susceptible of receiving a beautiful polish, it is rather difficult to work. . . . Formerly it was largely used in shipbuilding, and is still occasionally employed for this purpose."—Silva VIII, 101. Footnote 2 on this page of Silva gives an interesting account of reservations by Congress of live oak timber in 1799, 1817, 1825, and their partial abandonment in 1879 and 1895, though the Florida reservation was still held at the date of the writing.

⁹⁵ "This is a low, round topped tree, occasionally eighty or ninety feet in height, with a trunk three or four, or rarely six or seven, feet in diameter."—Silva VIII, 111. "It is very abundant and grows to its largest size in the valleys south of San Francisco Bay. . . . In southwestern California it is the largest and most generally distributed oak tree between the mountains and the sea." "Valued and largely used for fuel, it is little esteemed for other purposes."—Silva VIII, 112.

ern to Lower California, is known as California live oak, but is of little value except for fuel. *Q. chrysolepis*⁹⁶ is another Pacific Coast variety.

Quercus rubra.⁹⁷ Red oak. In the commercial red oaks are also often included *Q. texana*,⁹⁸ Texan oak (formerly classified as a variety of the *rubra* species), northeastern Iowa and central Illinois south through western Kentucky and Tennessee to Florida, and through southern Missouri, Arkansas and Louisiana to western Texas; ⁹⁹ *Q. digitata*¹⁰⁰ (*Q. falcata* Michaux), or Spanish oak, from southern New Jersey to central Florida and through the gulf states to eastern Texas, Arkansas, southwestern Missouri to middle Tennessee and Kentucky, and southern Illinois and Indiana; and other rarer species. *Q. rubra* ranges from Nova Scotia and southern New Brunswick¹⁰¹ through Quebec and along the northern shores of Lake Huron; southward to middle Tennessee and Virginia, and along the Appalachian Mountains to northern Georgia; west to eastern Nebraska and central Kansas.

Quercus prinus.¹⁰² Chestnut oak. Used to some extent for lumber purposes,¹⁰³ but its chief commercial value lies in its tannin, which is extracted not only from the bark but from the wood itself in the form of cordwood. It is richest in tannin of any of the oaks, a far western variety, the tanbark oak of California (*Q. densiflora*),¹⁰⁴ also having this as its principal use. The range of *Q. prinus* is from southern Maine and eastern Massachusetts to Maryland, and in the mountains of northern Georgia and Alabama; westward from New York to central Kentucky and Tennessee. *Q. velutina*¹⁰⁵ is one of three tannic acid oaks given by Sargent.

⁹⁶ *Q. chrysolepis*. Live oak, hemlock oak, Sargent. Canyon live oak, Sudworth. "This California live oak is usually not more than forty or fifty feet in height, with a short trunk from three to five feet in diameter."—Silva VIII, 105. "More valuable as a timber tree than the other oaks of central California. . . . Although difficult to cut and work, it is used in the manufacture of agricultural implements and wagons."—Silva VIII, 107.

⁹⁷ "A tree, usually seventy or eighty feet, or occasionally nearly 150 feet in height, with a trunk three or four feet in diameter."—Silva VIII, 125.

⁹⁸ "A tree, occasionally almost two hundred feet in height, with a trunk free from branches for eighty or ninety feet, seven or eight feet in diameter above the much enlarged and strongly buttressed base."—Silva VIII, 129.

⁹⁹ "On the low river bottom lands of the Mississippi basin it attains its largest size and is exceedingly common." "Lumbermen and manufacturers consider it more valuable than the eastern red oak, with which it has always been confounded."—Silva VIII, 130.

¹⁰⁰ "A tree, usually seventy or eighty feet tall, with a trunk from two to three feet in diameter."—Silva VIII, 147. "The wood of the upland tree is hard and strong, not durable in contact with the ground, cross grained and liable to check badly in drying. . . . Sometimes used in construction, and largely as fuel."—Silva VIII, 148-9.

¹⁰¹ "The most boreal of the oak trees of eastern America." "Reaches its largest size in the states north of the Ohio River."—Silva VIII, 127.

¹⁰² "A tree, usually sixty to seventy, or occasionally 100 feet in height, with a trunk three or four, or rarely six or seven, feet in diameter."—Silva VIII, 51.

¹⁰³ "It is largely used in fencing, for railway ties and for fuel."—Silva VIII, 52.

¹⁰⁴ "The tanbark oak (of California) is usually seventy or eighty, or sometimes nearly 100 feet in height, and although its trunk generally does not exceed three feet in diameter, individuals with stems double that size occasionally occur."—Silva VIII, 183. "Exceedingly abundant in the humid California coast region north of San Francisco Bay. . . . Of little value for construction, it is largely used as fuel. The bark, which is exceedingly rich in tannin, is largely used for tanning leather, and is preferred for this purpose to that of any other tree in the forests of Pacific North America." "The only American representative of a peculiar group of Asiatic trees in which are combined the characters of the oak and the chestnut, *Q. densiflora* is, from the point of view of botanical geography and botanical archaeology, one of the most interesting inhabitants of the forests of the United States."—Silva VIII, 184.

¹⁰⁵ "A tree, often seventy or eighty, and occasionally 150 feet in height, with a trunk three or four feet in diameter."—Silva VIII, 137. "Grows to its largest size in the basin of the lower Ohio

*Ulmus*¹⁰⁶ *americana*.¹⁰⁷ White elm; also called American elm and water elm. From southern Newfoundland to north shores of Lake Superior, and to the eastern base of the Rocky Mountains, here extending up to the Saskatchewan River; south to Florida; west to Dakota, western Nebraska, western Kansas, Indian Territory and Texas.

Ulmus racemosa.¹⁰⁸ Cork elm. Known commercially as rock elm. From Quebec through Ontario, and south through northwestern New Hampshire to southern Vermont; westward through northern New York, southern Michigan, and Wisconsin, to northeastern Nebraska, southeastern Missouri, and middle Tennessee.¹⁰⁹ Sargent says, "most abundant and attains its largest size in Ontario and the southern peninsula of Michigan." Now becoming scarce through lumbering.¹¹⁰

*Magnolia*¹¹¹ *latida*¹¹² (*M. grandiflora* Linnæus). Magnolia, bull bay or big laurel. A good cabinet and interior finishing wood,¹¹³ but not widely used as yet except for fuel. Coast region of North Carolina to Florida, and westward in the Gulf Coast region to Texas; through western Louisiana to southern Arkansas.

Magnolia acuminata.¹¹⁴ Cucumber tree, mountain magnolia. Uses much the same as the magnolia. From western New York through southern Ontario to southern Illinois, and south in the Appalachian Mountains to southern Alabama and northeastern Mississippi; central Kentucky and Tennessee, and Arkansas except in the northwestern part.

River. The only species of the red oak group which reaches the south Atlantic and Gulf coasts, where, while not common and never gregarious, it is generally scattered on dry ridges through the Maritime pine belt."—Silva VIII, 138. "The bark is largely used in tanning (Trimble, 'The Tannins,' 31, f. 20, 21)."—Silva VIII, 139.

¹⁰⁶ *Ulmus*, "of which fifteen or sixteen species can be distinguished, is widely distributed throughout the boreal and temperate regions of the northern hemisphere, with the exception of western North America, where no elm tree is found. Reaching in the New World the mountains of southern Mexico, upon which one species occurs, and in the Old World the subtropical forests of the Sikkim Himalayas, the home of *U. lanceolata*. The forests of eastern North America contain five species; in Europe three species occur. . . . The type is an ancient one, its traces existing in the early Tertiary rocks of Greenland. Before the Glacial period it long inhabited Europe, western Asia and North America, where it abounded on the midcontinental plateau and reached westward to the shores of the Pacific Ocean."—Silva VII, 40, 42.

¹⁰⁷ "A tree sometimes 100 to 120 feet high, with a tall trunk six to eleven feet in diameter."—Silva VII, 43.

¹⁰⁸ "A tree eighty to 100 feet in height, with a trunk occasionally three feet in diameter, which diminishes slowly in thickness, and is often free of branches for sixty feet."—Silva VII, 47. "This name (*U. racemosa*) was used . . . in 1800 for a European species of elm, and therefore was not applicable to the American tree, for which the name of *U. thomasi* is proposed."—Silva XIV, 102.

¹⁰⁹ Sargent gives *U. serotina* as a distinct species in his appendix XIV, 41, 42, and credits it with the middle Tennessee distribution formerly assigned *U. racemosa*.

¹¹⁰ "The value of the wood of the rock elm threatens its extinction; the most of the large trees have already been cut in the forests of Canada, New England, New York and Michigan."—Silva VII, 48.

¹¹¹ "The genus *Magnolia* is now confined to eastern North America, southern Mexico, and eastern and southern Asia. Twenty species are known. Of these, six are North American, with their center of distribution in the southern Allegheny Mountain region; two are Mexican; ten are eastern Asiatic; one is a native of the mountains of Yun-nan, and four are Himalayan."—Silva I, 1.

¹¹² "A noble tree, . . . sixty to eighty feet in height, with a tall, straight trunk sometimes under favorable conditions four to four and a half feet in diameter." "On the rich high rolling hills of the Mississippi bluffs, this tree reaches its highest development."—Silva I, 3.

¹¹³ "The wood of *M. latida* is harder, heavier, and more valuable than that of the other North American magnolias."—Silva I, 4.

¹¹⁴ "A tall, slender tree, attaining in its native forests a height of sixty to ninety feet, with a trunk three or four feet in diameter." "It flourishes on the lower slopes of mountains, on the rocky banks of streams, and in narrow valleys, reaching its greatest size and abundance in those about the base of the high mountains of Carolina and Tennessee."—Silva I, 7.

Liriodendron tulipifera.¹¹⁵ Tulip-tree. Known commercially as yellow poplar, though not a *Populus* and belonging to the *Magnoliaceae* family instead of the *Salicaceae*. The only living species of the fossil *Liriodendron* genus,¹¹⁶ and one of the most valuable¹¹⁷ of American hardwoods, though occurring in a restricted range and nowhere forming compact bodies of timber, the best timber averaging in large tracts only 1,000 to 3,000 feet board measure to the acre, intermixed with oak and other hardwoods. Range from Rhode Island to southwestern Vermont and west to Lake Michigan; south to Florida, southern Alabama, and Mississippi; west of the Mississippi River in southeastern Missouri and adjacent Arkansas.¹¹⁸

*Liquidambar*¹¹⁹ *styraciflua*.¹²⁰ Sweet gum. Known also as red gum, and in the export markets as satin walnut. A valuable lumber wood, though difficult to season properly. Used as a general building, box and veneer lumber and (especially in Europe) as a furniture and interior finishing wood. From Connecticut to southeastern Missouri and Arkansas; south to Florida and Texas.¹²¹ Sargent says: "Has its greatest development in the bottom lands of the Mississippi basin."

Platanus occidentalis.¹²² Sycamore. Sometimes used as a cheap furniture wood, but chiefly for tobacco boxes.¹²³ Southeastern New Hampshire and southern Maine to northern Vermont and Lake Ontario; west to eastern Nebraska and

¹¹⁵ "One of the largest and most beautiful trees of the American forest. The occidental plane and the southern cypress are the only American deciduous trees which grow to a larger size. It sometimes attains, under favorable conditions, a height of 160 to 190 feet, with a straight trunk eight or ten feet in diameter, destitute of branches for eighty or 100 feet from the ground. Individuals 100 or 150 feet tall, with trunks five or six feet in diameter, are still common."—Silva I, 19.

¹¹⁶ "The genus *Liriodendron*, with a single species, is found in eastern North America and western China. It was represented by several species in the Cretaceous age, when the genus was widely distributed in North America and Europe. It continued to exist during the Tertiary period, with a species, hardly different from the one now living, extending over eastern North America, and Europe as far south as Italy, until the advent of Glacial ice destroyed it in Europe, and restricted its range in America to the shores of the Gulf of Mexico."—Silva I, 17.

¹¹⁷ "One of the most valuable products of the American forest. Canoes made from it were used by the aborigines when this country was first visited by Europeans, and ever since it has been largely manufactured into lumber used in construction, in the interior finish of houses, in boat building, and for shingles, pumps and woodenware."—Silva I, 18.

¹¹⁸ Though "yellow poplar" has for years been shipped from a wide extent of territory west of the Mississippi River, including points as far south as northern Louisiana, it is claimed by some careful observers in the lumber trade that no true yellow poplar (*Liriodendron tulipifera*) grows west of the Mississippi and that all such shipments have been of cottonwood (*Populus deltoides*). However, Sargent and Sudworth agree in the statement that *Liriodendron* is found west of the Mississippi, but so limit its range that the contention noted above is sustained in the main.

¹¹⁹ *Liquidambar* is now confined to the eastern United States, to central and southern Mexico, Central America, the Orient, and middle and southeastern China; although . . . the immediate ancestor of the existing American species inhabited Alaska, Greenland, and the midcontinental plateau of North America. . . . Three species are distinguished in the genus as it is now usually limited: *L. styraciflua* is American; *L. orientalis* inhabits a few provinces in southwestern Asia Minor; and *L. formosana* is found in China and on the island of Formosa." "All the species produce hard, straight grained, handsome, dark colored wood and valuable balsamic exudations."—Silva V, 7.

¹²⁰ "A tree, eighty to 140 feet in height, with a straight trunk four or five feet in diameter."—Silva V, 10.

¹²¹ "It reappears on the mountains of central and southern Mexico and ranges southward to the highlands of Guatemala."—Silva V, 11.

¹²² "A tree, occasionally 140 to 170 feet in height, with a trunk sometimes ten or eleven feet in diameter, above its abruptly enlarged base."—Silva VII, 102. *Platanus* has six or seven species, three of them in temperate North America. It flourished in late Cretaceous and Tertiary periods, when it inhabited Greenland and arctic America in a form hardly distinguishable from the existing species of eastern North America and Europe.

¹²³ "It is largely used and is the preferred material for the boxes in which tobacco is packed, for ox-yokes, and butcher blocks, and for furniture and the interior finish of houses, where its broad, conspicuous, medullary rays and cheerful color make it valuable."—Silva VII, 103.

Kansas; south to northern Florida, central Alabama and Mississippi, and Texas. The only other two sycamores are western varieties: *P. racemosa*, California to Lower California, and *P. wrightii*, southwestern New Mexico, southern Arizona, and Mexico. Neither are recognized commercial woods.

*Pyrus*¹²⁴ *americana*. Mountain ash. Also called rowan in Canada and elsewhere. Of no commercial importance, but one of the most northern deciduous woods. Range from Newfoundland through the upper central part of the Labrador Peninsula to Hudson Bay, west to Reindeer Lake and northern Manitoba; south through Quebec and Ontario, Great Lake region, and high elevations in northeastern United States to eastern Tennessee, Virginia and North Carolina.

*Prunus*¹²⁵ *serotina*.¹²⁶ Black cherry. Known commercially as cherry, a valuable cabinet wood, now becoming scarce, and widely imitated in stained birch. From Nova Scotia westward through the Canadian provinces to the Kaministiquia River; south to Florida; west to North Dakota, eastern Nebraska and Kansas, Indian Territory, and eastern Texas; western Texas in the mountains.¹²⁷

*Robinia*¹²⁸ *pseudacacia*. Locust, acacia, yellow locust.

*Gleditsia*¹²⁹ *triacanthos*. Honey-locust, three thorned acacia. Although these two trees do not even belong to the same genus the wood is very similar and has the same commercial uses in both species; a very strong, hard wood, the *Robinia* somewhat the heavier, both very durable in contact with the ground; used to some extent for cabinet woods, turnery, wagon hubs, and locally for construction purposes, but more especially for posts, and now being planted by some railroad companies on an extensive scale (more especially the locust)

¹²⁴ "The genus *Pyrus* is widely and generally distributed through the temperate parts of the northern hemisphere; from thirty to forty species may be distinguished. . . . In North America the genus is represented by seven species, of which five are small trees and two are shrubs of the eastern states."—Silva IV, 68. This genus includes *Pyrus malus*, the apple, supposed to be indigenous in the northwestern Himalayas, and *Pyrus communis*, the pear tree.

¹²⁵ "Of the genus *Prunus*, now extended to include the plums, almonds, peaches, apricots and cherries, about 120 species are distinguished. They are generally distributed over the temperate regions of the northern hemisphere. . . . The genus is represented in tropical America by numerous species. . . . It has no representative in . . . the southern countries of South America. In North America the genus is spread from the shores of the Atlantic to those of the Pacific, and from near the northern limits of tree growth, to southern Mexico. The territory of the United States contains at least twenty-five indigenous species, of which fourteen attain arborescent habit, and one is a large and important forest tree."—Silva IV, 8.

¹²⁶ "A tree, . . . sometimes attaining a height of 100 feet, with a stout, straight trunk four to five feet in diameter."—Silva IV, 45. "*P. serotina* is one of the most valuable timber trees of the American forests. . . . The wood of no other North American tree is better colored or more valuable for cabinet making and the fine interior finish of houses, and the great demand for it for these purposes has caused a destruction of the largest and best trees in all parts of the country."—Silva IV, 46-7.

¹²⁷ Sargent enlarges the range of *P. serotina*, stating it is distributed along the mountain ranges of southern New Mexico and Arizona and on those of Mexico and the Pacific regions of Central America, Colombia and Peru.—(Silva IV, 46.)

¹²⁸ "The genus *Robinia* is North American. Four species inhabit the territory of the United States; and two, or possibly more, very imperfectly known, occur in Mexico."—Silva III, 37.

¹²⁹ "*Gleditsia* is represented in the flora of eastern America by two species, one of which is the type of the genus."—Silva III, 73. Besides honey-locust and other species is *aquatica*, the water locust. It grows "fifty to sixty feet in height, with a short trunk from two to two and a half feet in diameter, usually dividing a few feet from the ground."—Silva III, 79. Water locust is "found in the coast region of the southern Atlantic states, from South Carolina to Matanzas Inlet in Florida, and in the gulf states from the shores of Tampa Bay to the valley of the Brazos River in Texas; it spreads northward through western Louisiana and southern Arkansas to middle Kentucky and Tennessee, and to southern Illinois and Indiana."—Silva III, 80.

in order to provide future railroad tie material. *R. pseudacacia* ranges in the Appalachian Mountains¹³⁰ from Pennsylvania to northern Georgia, and is probably also indigenous in parts of Arkansas and Indian Territory; widely naturalized and escaped from cultivation in many other parts of the country. *G. triacanthos* ranges from the western slopes of the Allegheny Mountains in Pennsylvania to Georgia and west to Texas through the gulf states; and from Pennsylvania west through southern Michigan¹³¹ to eastern Nebraska and Kansas, and Indian Territory; escaped from cultivation in many other sections; "reaching its greatest development in the bottoms of the lower Ohio River basin" (Sargent).

*Swietenia*¹³² *mahogani*.¹³³ Mahogany. Occurs in the United States only on the Florida Keys, and not in commercial size and quantity there, though it sometimes reaches a diameter of two feet in that locality. Worthy of mention because of its commercial importance as the most valuable wood of the North American tropics.¹³⁴

*Ilex*¹³⁵ *opaca*. American holly. Being the only holly of economic value, it is usually known commercially simply as holly. A valuable cabinet and turnery wood, nearly white in color and turning light brown on exposure. Coast region from Massachusetts to Florida, through the gulf states to eastern Texas, and from southern Indiana south in the Mississippi River valley, "reaching its greatest development in the rich bottoms of southern Arkansas and eastern Texas" (Sargent).

*Acer*¹³⁶ *saccharum* (*Acer barbatum*¹³⁷). Sugar maple. Called also hard or rock maple. The most valuable¹³⁸ commercial species, and usually indicated

¹³⁰ "It is most common and attains its best development on the western slopes of the mountains of West Virginia."—Silva III, 40.

¹³¹ "In the valleys of the smaller streams of southern Indiana and Illinois *G. triacanthos* attains its greatest size and majesty. Here individuals may still (1893) be found from 120 to 140 feet in height, with trunks six feet in diameter and free of branches for sixty or seventy feet."—Silva III, 76.

¹³² "*Swietenia*, of which three species are recognized, is tropical American and west-tropical African. *S. mahagoni*, the type of the genus and one of the most valuable timber trees known, is distributed from south Florida, the most northern station of the genus, to Mexico, Central America and Peru. *S. humilis*, perhaps a form of the last species, is found on the Pacific Coast of Mexico. *S. angolensis*, a large deciduous tree, inhabits the mountain forests of central Quitta in west-tropical Africa."—Silva I, 99.

¹³³ "A tree, with a trunk forty or fifty feet in height and six or eight feet in diameter above the swell of the great buttresses which sometimes expand ten or twelve feet from the trunk, and with massive spreading branches." "Grows in Florida on Key Largo and on Elliott's Key. It is found on the Bahama and West India islands; it is widely distributed in tropical Mexico and Central America and occurs in Peru."—Silva I, 100, 101.

¹³⁴ "The wood of other trees sometimes appears in commerce under the name of mahogany. . . . *Khaya senegalensis*, a large tree of west-tropical Africa, supplies the so-called African mahogany."—Silva I, 101, footnote No. 3.

¹³⁵ "About 175 species are now recognized, the headquarters of the genus, as represented by the largest number of species, being in Brazil and Guiana, where sixty-seven are known. The mountain regions of western South America contain at least ten species; seven have been distinguished in southern Mexico and Central America and ten in the West Indies; while in eastern North America there are thirteen or perhaps fourteen species, of which four are small trees."—Silva I, 103-4.

¹³⁶ "The genus *Acer* is represented in all the geographico-botanical divisions of the northern hemisphere, but extends south of the Equator only to the mountains of Java. . . . In North America nine species occur; five of these belong to the Atlantic and two to the Pacific region; one is peculiar to the central mountain ranges and one extends across the continent."—Silva II, 79, 80.

¹³⁷ Preferred by Sargent.

¹³⁸ "A noble tree, 100 or 120 feet high, with a trunk three or four feet in diameter, rising sometimes in the forest to the height of sixty or seventy feet without a branch." "*A. barbatum* is one of the most widely and generally distributed trees of eastern North America." "The wood

where "maple" is specified. "Bird's-eye" and "curly" maple are accidental (not varietal) forms of this species. From southern Newfoundland to Lake of the Woods and Minnesota; south through the northern states, and on the Allegheny Mountains to northern Georgia and western Florida; west to eastern Nebraska, eastern Kansas, and eastern Texas.

Acer saccharinum (*A. dasycarpum* Ehrhart). Silver maple. Usually known commercially as soft maple, and used to some extent for furniture, flooring, etc., as a cheaper substitute for hard maple, being lighter in weight¹³⁹ and of inferior wearing quality. From New Brunswick to western Florida; west to southern Ontario, and through Michigan to eastern Dakota, Nebraska, Kansas, and Indian Territory. Widely cultivated elsewhere as a shade tree.

Acer negundo (*Negundo aceroides* Moench). Box elder. Also known as ash-leaved maple, mountain maple, Manitoba maple. Commercially of somewhat limited use for interior finish, woodenware, cooperage and paper pulp. The most northern of the *Acer* genus, extending from Vermont,¹⁴⁰ New York, and eastern Pennsylvania¹⁴¹ northwestward to Winnipeg, to the eastern base of the Rocky Mountains in British Columbia, and to Montana, Utah, western Texas, New Mexico and eastern Arizona; south in the eastern mountains to Florida.

Acer rubrum. Red maple, swamp maple. A species generally distributed throughout the eastern half of the United States, frequenting, especially, the borders of streams and swamps. Its wood is heavy and close grained, but easily worked and not very strong. It is used in the manufacture of furniture, turnery, for woodenware and for gun stocks. From New Brunswick, Quebec and Ontario (latitude 49 degrees) to Florida; west to Lake of the Woods, eastern Dakota and Nebraska; Indian Territory and eastern Texas.

*Tilia*¹⁴² *americana*. Basswood. Also known as linden, and locally as linn, lind or lein. A commercially important wood of wide distribution, though the genus is not represented at all on the Pacific Coast. Range, New Brunswick to Virginia and along the Allegheny Mountains to Georgia and Alabama; west in Canada to Lakes Superior and Winnipeg, to the Assiniboine River, and in the United States to the eastern Dakotas, eastern Nebraska, Kansas, Indian Territory and eastern Texas.¹⁴³ *T. heterophylla*, or white basswood, is undistin-

of the sugar maple is more valuable and more generally used than that of any other American maple."—Silva II, 97, 98.

¹³⁹ Sargent (Silva, volume II, page 98 and page 104) gives the specific gravity of absolutely dry wood of sugar maple as 0.6912, equivalent to a weight of 43.08 pounds a cubic foot, while the specific gravity of soft maple is 0.5289, equivalent to a weight per cubic foot of 32.84 pounds.

¹⁴⁰ Doctor Bell speaks of Minnesota as being the general eastern limit of this tree, and his timber map does not show its boundary line east of the point where it strikes the western end of Lake Superior.

¹⁴¹ "I am not certain if this tree is native in Pennsylvania. Around Easton it is spread everywhere over fields from the seeds of trees planted along the streets of the city."—T. C. Porter, quoted by Sargent in Silva XIV, 99.

¹⁴² "The genus *Tilia* is widely distributed in the temperate regions of the northern hemisphere. . . . It is represented in eastern North America by four species, of which one is Mexican."—Silva I, 49.

¹⁴³ "*T. americana* is one of the most common trees in the northern forest. It occupied, before the country was generally cleared, large tracts of the richest land to the exclusion of other trees, or often formed two-thirds of the forest growth. . . . It is less common towards the southern and western limits of its range than it is near the northern boundary of the United States; reaching, however, its greatest size on the bottom lands of the streams which flow from the north into the lower Ohio River."—Silva I, 53.

guished commercially within its range, which is from Pennsylvania through the Allegheny Mountains to western and central Florida and Alabama; west to southern Indiana and Illinois, Kentucky and middle Tennessee.

Cornus florida. Flowering dogwood. Known commercially as boxwood. An extremely hard wood of some use in turnery, and for engraving blocks, shuttle blocks and other limited special purposes. From eastern Massachusetts to central Florida, and west through southern Ontario, southern Michigan, to southwestern Missouri, southeastern Kansas,¹⁴⁴ Texas and Mexico. Having its greatest development in the South.

Nyssa ¹⁴⁵ *sylvatica*. Black gum. Known also as tupelo, but the tupelo gum of commercial nomenclature is the following species. From Maine to Florida; west to southern Ontario, southern Michigan, southeastern Missouri, and Texas.

Nyssa aquatica ¹⁴⁶ (*N. uniflora* Wangenheim). Tupelo gum. Also known commercially, and particularly in the export trade, as bay poplar. Used for wagon hubs, turnery, cooperage, and coming into use as a cheap furniture and interior finish wood. Coast region from southern Virginia to northern Florida, and through the gulf states to Texas; northward through Arkansas, western Tennessee, and Kentucky, southern and southeastern Missouri to southern Illinois.

Diospyros ¹⁴⁷ *virginiana*. ¹⁴⁸ Persimmon. Of considerable commercial utility for nearly the same purposes as dogwood (except engravers' blocks), and probably used in larger quantity than that wood; ¹⁴⁹ preferred for shuttle blocks. Range from Connecticut and southern New York to Florida; from southern Ohio to southern Alabama; west to southwestern Iowa, southern Missouri and eastern Kansas, Indian Territory, and Texas.

Fraxinus ¹⁵⁰ *americana*. ¹⁵¹ White ash. ¹⁵² From Nova Scotia and Newfoundland

¹⁴⁴ Silva XIV, 101, is authority for including southeastern Kansas.

¹⁴⁵ " *Nyssa* is now confined to the eastern United States, where three species are distinguished, and to southern Asia, where the genus is represented by a single species."—Silva V, 78.

¹⁴⁶ "A tree, eighty to 100 feet in height, with a trunk three or four feet in diameter above the greatly enlarged tapering base."—Silva V, 83. "It is an inhabitant of deep swamps inundated during a part of every year, growing in great numbers with the cypress, the liquidambar, the swamp white oak, the water ash, the scarlet maple, the water locust and the cottonwood. In some parts of the country, especially in the valley of the lower Mississippi River, the tupelo gum is one of the largest and most abundant of the semiaquatic trees. It attains its greatest size in the cypress swamps of western Louisiana and eastern Texas."—Silva V, 84.

¹⁴⁷ *Diospyros*. About 160 species, abounding principally in tropical Asia and Malaysia. Not represented in western North America. Two species in eastern North America. The ebony of commerce, and some other cabinet woods, is furnished by tropical species of this genus.

¹⁴⁸ "A tree, usually thirty to fifty feet in height, with a short trunk rarely more than twelve inches in diameter."—Silva VI, 7.

¹⁴⁹ "It is employed in turnery, for shoe lasts, plane stocks, and many small articles of domestic use; for shuttles it is preferred to other American woods."—Silva VI, 9.

¹⁵⁰ *Fraxinus*. Thirty species, nearly half of which inhabit North America. Found in all parts except the extreme north. The type is an ancient one, and during the Tertiary period inhabited the Arctic Circle, from which it gradually spread southward. Sargent gives *F. quadrangulata*, or blue beech, as "largely used for flooring, and in carriage building, and probably not often distinguished commercially from that of the other species of the northern and middle states."—Silva VI, 38.

¹⁵¹ "A tree sometimes 128 feet in height, with a tall, massive trunk five or six feet in diameter, although usually much smaller."—Silva VI, 43.

¹⁵² "One of the most valuable timber trees of North America. . . . It is used in immense quantities in the manufacture of agricultural implements, for the handles of tools, in carriage building, and for oars and furniture, and in the interior finish of buildings."—Silva VI, 44, 45.

to Florida; westward to Ontario and northern Minnesota, eastern Nebraska, Kansas, Indian Territory and Texas.

*Fraxinus lanceolata*¹⁵³ (*F. viridis* Michaux). Green ash. Inferior commercially to white ash, though often substituted. From Vermont to northern Florida; westward to the Saskatchewan River, eastern ranges of the Rocky Mountains, and extending into Utah and northern Arizona, and through eastern Texas.

*Fraxinus nigra*¹⁵⁴ (*F. sambucifolia* Lamarck). Black ash. A coarser wood than white ash, but nearly as largely used for many purposes.¹⁵⁵ From the northern shores of the Gulf of St. Lawrence and Newfoundland to Manitoba, and southward to Delaware, Virginia, southern Illinois, central Missouri, and northwestern Arkansas.

*Catalpa*¹⁵⁶ *speciosa*.¹⁵⁷ Hardy catalpa. Well adapted for cabinet work and interior finish, but more largely used for posts, railroad ties and for other purposes which bring it in contact with the soil, on account of its remarkable durability in such location,¹⁵⁸ it being preëminent among soft and rapidly growing woods in this respect. It has therefore been planted to some extent by railroad companies to grow for tie and fence post uses. Through southern Illinois and Indiana, western Kentucky and Tennessee, southeastern Missouri and northeastern Arkansas; elsewhere naturalized through cultivation, especially in southeastern Arkansas, western Louisiana, and eastern Texas. Should not be confounded with the common catalpa of dwarf habit widely planted as a shade tree (*C. catalpa*¹⁵⁹).

¹⁵³ Sargent gives this as a variety of *F. pennsylvanica*.—Silva VI, 50, and footnote No. 4.

¹⁵⁴ "A tree, occasionally eighty or ninety feet in height, with a tall trunk rarely exceeding twenty inches in diameter."—Silva VI, 37.

¹⁵⁵ "It is largely used in the interior finish of houses and cabinet making, and for fences, barrel hoops, and in the making of baskets."—Silva VI, 38.

¹⁵⁶ *Catalpa*. "Is now confined to the eastern United States, the West Indies and China." Seven species, two in North America. Not seriously injured by insects or fungal diseases.—Silva VI, 86.

¹⁵⁷ "A tree, in the forest occasionally 120 feet in height, with a tall, straight trunk rarely four and one-half feet in diameter; usually smaller, though often 100 feet high, and when grown in open places rarely more than fifty feet in height, with a short trunk."—Silva VI, 89.

¹⁵⁸ "It is largely used for railway ties, fence posts and rails, and occasionally for furniture and the interior finish of houses."—Silva VI, 90.

¹⁵⁹ *C. catalpa*. "A tree, rarely sixty feet in height, with a short trunk sometimes three or four feet in diameter." "It is used and highly valued for fence posts, rails and other purposes where durable wood is needed."—Silva VI, 86, 87.

CHAPTER III.

LABRADOR AND NEWFOUNDLAND.

In taking up a discussion of the forest resources and lumber history of British North America it seems wise first to dispose of that comparatively small territory which did not in 1867 enter the Canadian Confederacy and thus become a part of the Dominion of Canada. Newfoundland remained independent, accountable only to the Imperial government and, therefore, with its jurisdictional dependency, the Labrador Coast, will be first considered.

LABRADOR.

A strip of seacoast 1,100 miles in length and, for the most part, consisting of bleak, rocky, forbidding cliffs opposing themselves to the waters of the Atlantic, comprises the present Labrador, under the jurisdiction of Newfoundland. It lies between the parallels of 52 and 61 degrees north latitude (about), and meridians 55 and 65 degrees west longitude from Greenwich, extending from Hudson Strait on the north, in a southeasterly direction to the Strait of Belle Isle on the south, which separates it from Newfoundland. To the southwest is the northeastern extremity of the Province of Quebec and the territory of Ungava, both of which formerly formed a part of Labrador. Previous to 1895 Labrador¹ included all that territory extending from Hudson and James bays and Ontario on the west to the Gulf of St. Lawrence and the Atlantic on the east, the southern boundary being the "Height of Land," but during that year a division was made and the eastern coast strip, comprising about 7,000 square miles, was designated as Labrador, and the region to the west as Ungava, which, being a territory of Canada, will be treated under that head, though often referred to as "the Labrador Peninsula," in accordance with still prevailing habits of thought.

Hundreds of years before the time of Columbus, Labrador is believed to have been visited by Northmen from Greenland and Iceland. In the year 1000 Leif, son of Eric the Red, started out to find an un-

¹ Prior to the creation of the district of Ungava, in 1895, and the limitation of the jurisdiction of Labrador to a coast strip, and prior to an order in council on December 18, 1897, by which the boundaries of Ungava were changed, Labrador had an area estimated at about 430,000 square miles. By the changes referred to, the former area of Labrador was distributed about as follows: Labrador Coast 7,000 square miles, Ungava 355,000 square miles, while the area of Quebec was increased by about 58,000 square miles.

known land, which Biarne Heriulfson, sailing from Iceland to Greenland in 986 and being driven by a storm to the south, said he saw. Leif was successful, spent the winter in this new land, explored it and named different regions he visited Helluland, Markland and Vinland. Some investigators believed Helluland to be identical with Newfoundland, while others believe Helluland to have been Labrador or the north coast of Newfoundland, and Markland, Newfoundland. To just what extent these Norse records are to be credited is doubtful. Much of fiction has doubtless been woven in with the truth, as the records were made two hundred years after the voyages. Certain it is that no definite proof has ever been found of the presence of the Northmen on the American continent.

Labrador has the honor of being the first of the American continent to be reached by an explorer in modern historical times. Nearly fourteen months before Columbus on his third voyage saw the mainland of the new world he had unknowingly brought to light, and over two years before Amerigo Vespucci sailed west of the Canaries, on June 24, 1497, John Cabot discovered the western continent by sighting the dreary cliffs of Labrador. It was probably at about 56 degrees north latitude that he made his discovery. He skirted the coast for many leagues, coming also to the island of Newfoundland.

In 1500 Cortereal, a Portuguese navigator, voyaged to Newfoundland and Labrador, and is said to have given its name, which means "laborers' land," to Labrador. This name is accounted for in another way, also: A whaler by the name of Labrador penetrated the country as far as a bay, which, in honor of him, was called Labrador, though it is now known as Bradore Bay. In time the whole coast was given the whaler's name. Gomez, who sailed from Spain in 1525, while searching all along the coast from the sunny shores of Florida and Cuba to the frozen regions of the north in hope of finding a passage to India, came also to Labrador. But the distinction of being the first to make a landing on Canadian soil is given to Jacques Cartier, who landed at Esquimaux Bay, now called Hamilton Inlet, on June 21, 1534.

The history of the lumber industry of Labrador can be given in a single word, "nil." Comprising, as this country now does, but a narrow strip of sea coast, made up of rocky cliffs and fringed by many stony islands, and having its shores washed by the chilling Arctic current, which gives it an intensely cold and rigorous climate, there is not much chance for the growth of trees. What few there are have a stunted growth and are of practically no commercial value.

An account of the coast of Labrador was found among some papers of Sir Francis Bernard, governor of the province of Massachusetts Bay at the time it was written. The following is taken from this account: "Captain Henry Atkins sailed from Boston in the ship called the *Whale*, on a voyage to Davis Strait in 1729. . . . As Captain Atkins coasted that main, he found the country full of woods, alder, yew, birch and witch-hazel, a light, fine wood for shipbuilding; also fine, large pines for ship-masts, of a much finer grain than in New England, and of course tougher and more durable, though of a slower growth; and no question but naval stores may be produced here."

If, as the account says, this is a description of the coast of Labrador, it is very different from a true representation of that region today, and it seems from present indications that this must be a description of another coast passed by Captain Atkins on his journey north.

Practically the only industry of Labrador is its fisheries. During the fishing season thousands of fishermen from Canada, the United States and Newfoundland flock to the Labrador coast. The shore itself is adapted to this pursuit, as it is indented along its entire length by deep fiords and inlets. Cod, herring, salmon and seal are the principal fisheries.

NEWFOUNDLAND.

Newfoundland with its dependency, Labrador, constitutes one of the oldest colonies of Great Britain. This may be due to the fact that it is the nearest of any point in the western hemisphere to Europe. In size it is the tenth largest island in the world and contains 42,734 square miles, having an area approximating that of the State of New York. It lies at the entrance to the Gulf of St. Lawrence, in the Atlantic Ocean, between the parallels of 46 degrees 37 minutes and 51 degrees 39 minutes north latitude, and in longitude west from Greenwich between 52 degrees 35 minutes and 59 degrees 25 minutes.

Lying, as it does, so near Labrador, from the southern point of which it is separated, at its northern extremity, by the Strait of Belle Isle, ten miles in width, it is not strange that the dates of its early discoveries and explorations are almost identical with those of Labrador. Newfoundland, like Labrador, is supposed to have been visited by the Northmen in the year 1000, and is thought by some to be the Helluland of Leif. In 1497 John Cabot discovered Newfoundland after touching the Labrador coast to the north. In 1500 Gaspar Cortereal, perhaps using Cabot's charts as a guide, struck the coast of Newfoundland at a

point north of Cape Race, on the southeastern coast. For a number of years after Cortereal's voyage the English continued sending ships to the island, chiefly for the purpose of fisheries. The Portuguese also established fisheries at about the same time. In 1524 Verrazano, in the interest of France, coasted from North Carolina to Newfoundland. In 1525 Gomez, sailing from Spain, reached Cape Race. Jacques Cartier in May, 1534, touched Cape Bonavista, in latitude 46 degrees north, but, finding the land still covered with snow and the shore ice-bound, he dared not attempt landing.

Several unsuccessful attempts at colonization were made by England, the first being in 1583. Lord Baltimore, who afterward figured in the history of Maryland, was at last successful in planting a colony on the eastern coast about forty miles north of Cape Race in the year 1623. Immigrants came later from Ireland, and colonies prospered, until by 1655 Newfoundland contained a population of about 2,000, distributed in fifteen small settlements along the east coast. These settlements were made up of fishermen of different nationalities, the French being especially active and having established several colonies. France desired possession of the whole island, but by the treaty of Utrecht, in 1713, Newfoundland and its dependencies were declared to be the possessions of Great Britain. Fishing rights were, however, reserved to the French, which rights have been a matter of dispute ever since.

Newfoundland has never joined the Canadian Confederacy, and though attempts have been made repeatedly toward that end it still remains an independent colony of Great Britain.

The coast of Newfoundland is rugged and rocky, and deeply cut by numerous fiords and bays, which furnish a great number of good harbors. The coast is practically treeless, but the interior of the island contains valuable forests, especially in the regions of the rivers. The interior is an undulating plateau traversed by ranges of low hills. Near the western coast is the principal mountain range, known as Long Range, which extends nearly the entire length of the island, reaching far into the northwestern part, which is a long peninsula stretching in a northeasterly direction past the Strait of Belle Isle. This peninsula is believed to be barren for the most part and undesirable for settlement. Newfoundland contains a remarkably large number of lakes and rivers. Most of the larger rivers have their source in the lakes in the interior, taking their courses through many fertile valleys in all di-

rections to the ocean. This interior region has not yet been thoroughly explored, and it was not until later than 1880, when railroad construction was begun, that much was known of its physical characteristics. The largest river is the Exploits, which rises in the southwestern part of the island, flows in a northeastern direction, expands near the central part into the Red Indian Lake, and empties into the Bay of Exploits, an inlet from Notre Dame Bay. This river drains an area of between 3,000 and 4,000 square miles, many parts of the valley through which it flows containing forests of fine pine timber. The largest lake of Newfoundland is Grand Lake, about fifty-six miles long and five miles broad; the next in size is Red Indian Lake, nearly thirty-seven miles long and five or six miles in width.

While the east coast of Newfoundland is practically treeless the interior is well wooded. The following is a list of the principal trees found on the island, given in order, beginning with the one covering the least area, or, in other words, the one whose northern limit is the farthest south:

Sugar maple (*Acer saccharum*).—Of very limited area. Found on the northern and eastern shores of St. George's Bay, which is on the west coast just north of the southwestern point of the island.

White elm (*Ulmus americana*).—Found on St. George's Bay and on the peninsula stretching to the southwest of the bay, as far as Cape Ray, the extreme southwestern point of Newfoundland.

Black ash (*Fraxinus nigra* or *F. sambucifolia*).—Grows over the entire Southwestern Peninsula and to the eastward along the southern shore of Newfoundland.

Yellow birch (*Betula lutea*).—Grows in the central and southern part of the island, covering about seventy-five percent of the whole area.

White and red pine (*Pinus strobus* and *P. resinosa*).—Occupy about eighty-five percent of the entire area, being found in all parts except the Northern Peninsula and the northeast coast region.

Balsam fir (*Abies balsamea*).—Found in all parts of the island except the northern half of the Northern Peninsula.

Paper birch (*Betula papyrifera*), aspen (*Populus tremuloides*), balsam poplar (*Populus balsamifera*), commonly known as balm of Gilead, and larch (*Larix laricina* or *L. americana*), commonly called tamarack, are found in all parts of Newfoundland except the northern part of the Northern Peninsula, the limit of each one extending slightly farther to the north than the preceding one.

Black spruce and white spruce (*Picea mariana* or *P. nigra*, and *P. canadensis* or *P. alba*).—Found over the entire island except the north-eastern extremity of the Northern Peninsula.

It is only recently that the immense timber resources of the forests of the interior of Newfoundland have been made available, owing to the want of means of communication. The island is but sparsely settled, the inhabitants being mainly confined to the neighborhood of the coast, where, until recently, they were engaged almost exclusively in the fisheries. Persons to whose interest it was to keep the inhabitants at the fisheries, represented the interior as a barren waste; however, the exact opposite has been proved to be the truth. The lumber industry has been on a small scale until a few years ago, when it began to develop rapidly owing to the stimulus of railway construction, which opened up some of the best lumbering districts in the interior. The Newfoundland railway, which traverses the entire island from St. John's, on the Southeastern Peninsula, to Port-aux-Basques, in the southwestern extremity, a distance of 548 miles, was opened for traffic over its entire length in 1898. Sections of it had been in operation for some years before that time, which had done a good deal to develop the lumber trade.

Newfoundland contains large tracts of pine, besides great areas of spruce suitable for pulpwood, and fir which is as tough as spruce and has been found by exhaustive tests to make almost as good pulp. The utilization of fir greatly increases the quantity of timber available for pulp purposes. The principal lumbering districts are the Gander, Gambo and Exploits valleys, and on the west coast the Humber valley and St. George's Bay district.

The "History of Newfoundland," by D. W. Prowse, published in 1895, contains the following reference to the progress of the lumbering industry as the result of railway construction :

Although only in operation for one season the northern railway has developed splendid granite quarries and a lumber business which bids fair to be one of the greatest industries of the colony, already consisting of several great mills besides smaller operators and hand loggers whose united turn-out this year [1893] will not be less than 20,000,000 feet of lumber. Botwoodville, owned by the Exploits Lumber Company, of London, will cut 6,000,000 feet of lumber; the Benton mill at Soulis Brook, owned by Mr. Reid, another 6,000,000; the Campbell mill at Terra Nova River, 3,000,000; Sterritt's mill at Gander Crossing, Glenwood, about 1,000,000. At Gambo there are the five mills of Messrs. John Murphy and Osmond; at Gander Arm, Philips' mill, with unrivaled facilities for collecting and shipping; Arthur's mill, and some smaller establishments. The whole cut of timber for the season of 1893 may be safely estimated at 20,000,000 feet, which, at the low average price of \$15 a thousand feet, amounts to \$300,000.

American capital is transforming the lumber business of Newfoundland. A corporation, The Timber Estates Company, headed by H. M. Whitney, of Boston, Massachusetts, acquired several of the largest properties in the island and in 1904 operated them on a scale unequaled before. George J. Barker, of Boston, acquired another large grant and developed it extensively, and an American syndicate in 1904 began negotiating for tracts on the west coast for charcoal manufacture as well as lumbering operations.

One of the largest operators on the island until he sold to The Timber Estates Company in 1903, was Lewis Miller, a Scotchman, who for a quarter of a century was engaged in lumbering operations in Sweden. Owing to the exhaustion of the supply which he controlled there, he removed his plant to Newfoundland about 1900, erected three large sawmills, built twenty-five miles of branch railway and sidings and constructed the largest lumber wharf in the colony at Lewisport, on Notre Dame Bay, on the east coast. His output of lumber was handled over fifty to seventy-five miles of the Newfoundland railway to this wharf. The product of his mills was principally spruce, but included a quantity of white pine and tamarack. The largest of these sawmills, located on Red Indian Lake and reached by a branch line, twenty-one miles in length, connecting with the Newfoundland railway, employed over three hundred people day and night. It is estimated that the limits which he owned, provided that they escape devastation by forest fires, will yield a yearly cut of 40,000,000 feet for the next fifty years.

Latterly Newfoundland has attracted numerous lumbermen who formerly operated in Nova Scotia, but who have been compelled to abandon or limit their business there on account of the depletion of their limits. Another factor which tends to the growth of the industry in this colony is the great advantage which it possesses over the Maritime Provinces of the Dominion in point of nearness to the European markets, the distance being much shorter than that from the most eastern ports of the mainland.

The enormous pulpwood resources of the island are attracting much attention from British manufacturers, owing to the increasing difficulty experienced by English newspaper proprietors in securing adequate supplies of paper. Alfred Harmsworth & Bros., publishers of the *Daily Mail* and other journals in London, have secured from the Newfoundland Timber Estates Company, for the sum of \$500,000, the pulp concession on 2,000 square miles of timber in the interior, for the establishment of a large pulp and paper-making plant.

Accurate information as to the extent of the lumbering industry of Newfoundland is afforded by the census of 1901, according to which there were, in the year previous, 195 sawmills, valued at \$292,790, for the supply of which 1,616,449 logs were cut, the output being 43,648,000 superficial feet of sawn lumber, of the value of \$480,555, and 16,197,000 shingles. The number of men employed was 1,408 in logging and 2,408 in the mills.

A comparison with the corresponding figures of the census of 1891 shows the rapid development of the industry during the decade and indicates that in all probability there has been an equal rate of increase during the last few years. In 1890 (census of 1891) the number of sawmills reported was fifty-three, valued at \$178,510; number of logs cut, 415,600; output, 13,682,000 superficial feet of sawn lumber, valued at \$299,634, and 6,275,000 shingles; number of lumberers employed, 625; number employed in mills, 807.²

The cut of lumber in 1904 was by far the largest in the lumber history of Newfoundland, being double that of the preceding year, and was divided among the different mills as follows: Newfoundland Timber Estates, Limited, 40,000,000 feet; New Lands Lumber & Pulp Company, 7,000,000; Botwoodville Mills, 10,000,000; Union Lumber Company, 10,000,000; Grand Pond and Deer Lake, 3,000,000; small mills, west coast, 2,500,000; small mills of White Bay, Notre Dame Bay, Bonavista Bay, Trinity Bay, Conception Bay and southwest coast, 3,500,000; total, 76,000,000 feet. Of this amount 35,000,000 feet was exported, Great Britain being the chief market for it, some going to South America, and the remainder used for local demands. As short a time as fifteen years ago, most of the lumber used in Newfoundland was imported from Nova Scotia and other Canadian provinces, while now enough is manufactured within its own boundaries not only to supply the home demand but also to ship millions of feet to foreign countries.

CROWN LANDS TIMBER REGULATIONS.

Until a comparatively recent date no government dues were exacted from those engaging in lumbering. Subsequently a ground tax of \$2 a square mile was imposed with Crown dues of fifty cents a thousand feet on the cut, coupled with the condition that the purchasers of limits

² These statistics include Labrador (as that territory is under the government of Newfoundland), which at that time comprised what is now the territory of Ungava as well as the present Labrador, the division not having been made until 1895; but the lumber industry in that quarter was and is even yet very limited in extent.

must put up a mill and begin manufacturing within one year. In 1903 amendments were adopted making the regulations considerably more stringent. Under the law, as it now stands, timber licenses are issued at a bonus of so much a square mile, the amount being fixed according to location and value, but in no case to be less than \$2. In addition, an annual ground rent of \$2 a square mile is charged, together with a royalty of fifty cents a thousand feet board measure on all trees cut—except in Labrador, where the royalty is fixed at twenty-five cents a thousand. The licensee is bound to erect a sawmill of a capacity of 1,000 feet a day for every five square miles in his limit, or, as an alternative, to establish such manufactory of wood goods as may be considered an equivalent. The license may be granted for fifty years or for a longer period if deemed necessary. The licensee is bound to take from every tree cut all the timber fit for use and manufacture the same into sawn lumber or other salable products, to prevent all unnecessary destruction of growing timber and to exercise strict supervision to prevent fires.

Licenses to cut timber for pulp and paper manufacture may be granted for ninety-nine years or longer for areas of not less than five or more than one hundred and fifty square miles, at a charge of \$5 a mile and subsequent payments of \$3 a mile a year. The licensee must spend \$20,000 in the erection of buildings and machinery. No holder of either a timber or pulp license is allowed to remove for exportation any unmanufactured logs or timber.

Every indication points to a very extensive development of the lumbering and pulp-making industries of Newfoundland in the near future, as, in addition to abundance of the raw material, the island possesses unrivaled water power, cheaper labor than is obtainable elsewhere in North America and a shorter sea voyage to the principal markets than any rival. The principal danger to be feared is that of the destruction of her forests by fire as the country is opened up. It is estimated that the loss in 1904 from this source amounted to about \$20,000,000. Unless some better means of meeting this cause of annual loss be adopted than those now in force, it is certain to prove a serious drawback to the anticipated prosperity of the trade.

Forest fires were not unknown in this colony as early as 1818, as the following account of the voyage of H. M. S. *Rosamond* in that year to Newfoundland and the southern coast of Labrador, given by Edward Chappelle, will show:

"On the third day after our arrival one of our seamen, while employed in felling timber for the ship's use, was so imprudent as to kindle a fire in the forest, in the hope that, by the smoke, he would probably rid himself and his companions of the innumerable myriads of mosquitoes, which tormented them almost to madness. This scheme succeeded to their utmost wish, and they were rejoicing at their deliverance, when, in an instant, the whole country appeared enveloped in fire! A high wind drove the flames from tree to tree with the rapidity of lightning; and had it not been for the intervention of the river, the whole of the forest must have been inevitably reduced to ashes. . . . The rapidity with which the flames spread in the forests of these countries has been noticed by many early writers."

CHAPTER IV.

CANADA—ITS COMMERCIAL FORESTS.

Before taking up in detail the provinces and territories constituting the Dominion of Canada, it is well to review briefly the extent and location of the commercial forests of that country and to discuss various matters concerning the lumber interests of the Dominion as a whole.

The commercial forests of Canada are divided into two great sections—the eastern and the western. The western, which is included in the Rocky Mountain region and on the Pacific slope, will be reserved for detailed treatment in connection with the history of the lumber industry of the Pacific Coast of the United States, with which it is so closely connected and which have been developed together.

These western forests of commercial importance are practically all contained within the Province of British Columbia, the outlying woodlands and forests east and north of the Province being comparatively unimportant. The coast region of British Columbia, however, including Vancouver and other islands, is wonderfully rich in timber resources, probably being excelled in this respect by no section of similar size in the world.

British Columbia includes nearly all the Pacific Coast species particularly treated in the previous chapter. The leading woods are red fir (*Pseudotsuga taxifolia*), giant arborvitæ, or red cedar, western hemlock, bull pine (*Pinus ponderosa*), Engelmann spruce, tideland spruce, white pine (*Pinus monticola*), lowland fir (*Abies grandis*), etc. Between the western and eastern timber regions is the plains country of Alberta, Saskatchewan, etc., which is either open prairie, or a country of scattered groves and trees, or, in the north, a practically continuous forest of subarctic species and characteristics.

The timbered region of eastern Canada stretches in a continuous body from Manitoba east to the Atlantic, and north to Hudson Bay and the northern treeline described in Chapter II. As has before been remarked, there is no dividing line in tree growth between Canada and the United States corresponding to the international boundary, and in all the territory in which grow the commercial forests of Canada, and especially those suited for lumber purposes, the species represented all

exist south of the boundary line and, conversely, all, or practically all, of the commercial timbers of the northern United States are represented in the flora of Canada.

If this timber were equal in its quality to the area it covers and to its quantity, it would constitute one of the greatest forests on the globe; but as it is, with much of it dwarfed by climate and perhaps to some extent by inhospitable soil, it has an enormous quantity of merchantable timber. The most valuable part of these forests consists of white pine (*Pinus strobus*), red or norway pine (*Pinus resinosa*) and spruce.

Formerly there was an almost solid forest of hardwoods in southern Ontario, in that peninsula bounded by Lake Erie, Lake Huron and Georgian Bay and extending along the northern shores of Lake Ontario, but as these hardwood lands were particularly attractive to the farmer, they have been largely cleared and the result is an agricultural section seldom excelled in its productiveness and beauty. In these early years of the Twentieth Century, therefore, the hardwood resources and production of the Dominion are comparatively insignificant, though there is a considerable quantity of oak, maple, elm, ash, etc., yet remaining. There is still a sufficient supply to meet most of the domestic requirements, though for some of the more exacting classes of industries hardwoods are imported from the United States. Canada formerly exported hardwoods in considerable quantities, but the magnitude of that business has been much reduced.

The Height of Land, which is the dividing ridge or boundary line between the waters which flow into Hudson Bay or into the Atlantic north of the Strait of Belle Isle, and those which by the Great Lakes find their way through the St. Lawrence to the ocean, marks a somewhat clearly defined northern boundary of the most valuable soft woods. South of that line are found white and red pine, hemlock, tamarack, spruce, etc., of sizes which fit them for sawmill use. North of that line white and norway pine practically disappear and other species decrease in size as one goes north until, of commercial woods, spruce of diminished size is left standing in a continuous forest, extending to Hudson Bay—that great inland sea, which has been the dream of navigators, but which is not likely ever to assume large commercial importance—and to the northern treeline of the continent.

The basis of value of the present forests is the white pine, and it is, perhaps, worthy of note that the center of timber value is found in a latitude corresponding somewhat closely to the best growth of white

pine in the United States, which was in the lower peninsula of Michigan and in Wisconsin. Within the rough triangle bounded by the Ottawa River on the northeast, Georgian Bay and Lake Huron on the west and Lake Erie and Lake Ontario on the south, grow the finest forests of the Dominion. The pines in former years used to reach well down toward Lake Erie, but they have largely been cut away from that section, as the hardwoods were at a later date. Now this forest of especial value is restricted to the northern portion of this territory, reaching north to Lake Nipissing and the Ottawa River, and beyond.

As one goes in any direction from this favored district, the forests change in character and decrease in value. Going east from the Ottawa River the woodsman finds a decrease in the amount of pine and an increase in the amount of spruce, until below the City of Quebec the vast bulk of it is of the latter species. Perhaps the best spruce of the Dominion is found between the St. Lawrence River and the United States boundary, but there is also much fine log spruce north of the river, though as one goes north it decreases in size. Going north, northwest and west from the Georgian Bay district white and red pine constitute the bulk of the forests all the way to Manitoba, except through a district north of Lake Superior, where they are replaced largely by banksian or jack pine and other inferior timbers, but nowhere do they show such high quality as in the Georgian Bay and Ottawa River districts.

Spruce is the prevailing timber north of the Height of Land and grows in substantially solid forests. It is not, however, in that part of the Dominion, of log size to any great extent, but, nevertheless, constitutes a magnificent supply of pulpwood whose quantity can only be guessed at, but which will probably be sufficient to supply the needs of the world for generations. Comparatively little of that territory has been surveyed and much of it is totally unexplored. Even the latest maps of Ontario, issued by the Crown Lands Department of the Province, represent the course of streams by dotted lines only, indicating that their exact course is a matter of conjecture. While both pine and spruce were found in the original forests of both Ontario and Quebec, Ontario was, emphatically, the pine province and Quebec the spruce province. It is a matter of some dispute as to which of the two has the larger amount of spruce, but there is no question that the Quebec spruce forest is superior in the quality and availability of its spruce supply and particularly in the proportion of it that is of sawlog size.

The Maritime Provinces were originally heavily timbered, with, perhaps, the most dense forests in Nova Scotia.

The present condition of the individual timber resources of the provinces will be treated in connection with the lumber history of each of them, and it is enough to say here that the entire area of Canada south of the Height of Land from the Atlantic to Manitoba was originally covered with commercial lumber timber.

An outline definition of the leading lumber districts of the Dominion of Canada, is as follows: The Nova Scotia district, of which Halifax is the commercial, though not manufacturing, lumber center; the St. John River district, in New Brunswick, of which the center is the City of St. John; the Miramichi district, of eastern New Brunswick, of which Chatham is the center; the Chaleur Bay district, of northern New Brunswick and southeastern Quebec, of which Bathurst, Dalhousie and other points are centers; on the St. Lawrence River, the Quebec district, of which the City of Quebec is the commercial center; the Ottawa River district, of which Ottawa, with its environs, is the chief manufacturing center and Montreal the chief center from the standpoint of export trade; the Georgian Bay district, which includes all the territory draining into Georgian Bay, with many milling points, but its commercial interests most definitely centering at Toronto, and what may be called the western Ontario district, lying to the northwest of Lake Superior, having as manufacturing and commercial centers such points as Port Arthur and Pigeon River.

The commercial forests of Canada have been and are so located that they have been singularly independent, either from a logging standpoint or for marketing their product, of railroads. Indeed, it was not until the construction of the Canadian Pacific Railway that the railroad was to any important extent a primary means of marketing the product of Canadian mills; and even today its use is practically confined to the western provinces and territories. The great St. Lawrence water system, reaching from the head of Lake Superior to the Atlantic, with the never-failing streams flowing into it from the north, gives an adequate outlet for the timber and lumber production of Quebec and Ontario, while the Maritime Provinces, with their deeply indented coasts, find marine transportation sufficient.

British North America advanced much more rapidly in respect to the exportation of forest products than did the United States. There were two reasons for this: One was that the forests north of the

United States were, relative to population and domestic requirements, much more important than those of the United States; and, the second, that the ample system of waterways connecting with the Atlantic naturally led Canada to look abroad for its markets, especially as, until within the last fifty years, the market in the United States was almost completely supplied from domestic sources. Indeed, up to the time of the construction of the Champlain Canal, connecting Lake Champlain with the Hudson River, which was completed in 1822, and of the Oswego Canal, connecting Lake Ontario at Oswego with the Erie Canal at Syracuse, N. Y., completed in 1828, timber grown on the St. Lawrence watershed of New York, Vermont and New Hampshire, largely went to Montreal or Quebec and thence abroad.

Not only can the forests of Canada be logged by water, and its mills be located at the mouths of logging streams on deep water, but also the chief markets of the Dominion, in all that territory from the head of Lake Superior to the Atlantic, can be reached by water. Hence it is that Canada, at the time of this publication, was still pursuing methods of logging and of lumber transportation that largely obtained in the United States until twenty-five years ago, when the development of lumbering operations away from the water courses gradually brought about an increased use of the railroad in that country. British Columbia also is, to a considerable extent, served in its lumber interests by waterways; but there is a vast extent of rapidly developing country lying between Lake Superior and the Rocky Mountains and reaching from the national boundary north to the Peace River, that is dependent upon the railroads for its supply of building material, which must be furnished from the forests of western Ontario or from British Columbia, or to a certain extent from the smaller sized, but still available, timber north of Manitoba.

The following table gives the names of the several provinces and territories of the Dominion, the dates of their creation or admission into the confederation, their land area and total area, and the estimated area remaining afforested in 1904. All the columns relating to areas show variations from other tables, differences in forested areas being due to different estimates, while in the other columns the figures are changed¹ from time to time as the boundaries of the provinces and ter-

¹This list of provinces and territories was radically changed by an act of Parliament taking effect Sept. 1, 1905. That part of the Northwestern Territories lying west of the 110th meridian west of Greenwich (the fourth principal meridian of the Dominion system of land surveys), east of British Columbia and south of Mackenzie was made the new Province of Alberta, with an area of

ritories are changed or defined, and as the surveys become more accurate:

AREA OF FORESTS IN CANADA.

Name.	Date of Organization or Creation.	Area in Square Miles.		
		Total Area.	Land Area.	Forest Area.
PROVINCES.				
Ontario.....	July 1, 1867	260,862	220,508	82,528
Quebec.....	July 1, 1867	351,873	341,756	225,552
Nova Scotia.....	July 1, 1867	21,428	21,068	16,968
New Brunswick.....	July 1, 1867	27,985	27,911	17,538
Manitoba.....	July 15, 1870	73,732	64,327	25,626
British Columbia.....	July 20, 1871	372,630	370,191	285,554
Prince Edward Island.....	July 1, 1873	2,184	2,184	797
DISTRICTS.				
Keewatin.....	Apr. 12, 1876	470,416	456,997	696,952
Assiniboia.....	May 17, 1882	88,879	88,279	
Saskatchewan.....	May 17, 1882	107,618	103,846	
Alberta.....	May 17, 1882	101,883	101,521	
Athabaska.....	May 17, 1882	251,965	243,160	
Franklin.....	Oct. 2, 1895	*500,000	*500,000	
Mackenzie.....	Oct. 2, 1895	562,182	532,634	
Ungava.....	Oct. 2, 1895	354,961	349,109	
Yukon.....	June 13, 1898	196,976	196,327	
		8,745,574	8,618,818	1,351,505

*Estimated.

An outline sketch of the Canadian provinces and territories, with the distribution of timber in each, compiled from Canadian official sources, is as follows:

DISTRIBUTION OF CANADIAN WOODS BY PROVINCES.

Nova Scotia, which embraces 21,068 square miles of land, and New Brunswick, with 27,911 square miles, have large areas of spruce, hemlock, larch, pine, oak, elm, maple, beech and birch. Lumber makes up about two-thirds of their total exports.

Prince Edward Island, lying between the two, is about 150 miles long and much indented by bays. It has an area of 2,184 square miles. Agriculture has progressed in this Province and the remaining timber is chiefly confined to the northern end of the island, where there are small lumbering operations. The woods are the white and the black spruce, larch, elm and oak.

Quebec embraces a land area of 341,756 square miles. The forest

263,500 square miles and an estimated population of 250,000. The part lying between the 110th meridian and Manitoba and south of Mackenzie was made the new Province of Saskatchewan, with 251,100 square miles of area and an estimated population of 250,000. This division, however, left out a strip along the eastern end of Athabaska, exactly one degree of longitude in width, and clipped off the irregular eastern end of the old Province of Saskatchewan, no provision having been (in May, 1905) made for these two excluded areas, though doubtless they were to be added to the governments to the east by later enactment. The eastern boundary line of the new Province of Saskatchewan is therefore the western boundary line of Manitoba as far as that extends, beginning at about longitude 101 degrees 20 minutes on the international boundary and running due north, with an offset westward on each survey correction line. This holds true in the new extension of the boundary northward from the northwestern corner of Manitoba, until at about latitude 55 degrees 40 minutes these offsets bring the line in coincidence with the 102nd meridian and that becomes the boundary line for the remainder of the distance. The provisional capital of Alberta is Edmonton, and that of Saskatchewan is Regina.

lands are of great magnitude and include most of the staple woods common to the eastern and central states.

Ontario has a land area of 220,508 square miles and a water area of 40,354 square miles. There are large areas of forest.

Manitoba includes 73,732 square miles, of which 64,327 are land. The principal timber is poplar, with some white elm, green ash, box elder and mossycup oak, the latter forming a scrub growth in most parts of the Province. White spruce is also found over a limited area. The trees in the northern part of Manitoba are large enough to be merchantable.

The Northwestern Territories, which adjoin Manitoba, in many respects resemble that Province. They consist of four provincial districts: Assiniboia, with a total area of 88,879 square miles, Saskatchewan, embracing 107,618 square miles, Athabaska, with 251,965 square miles and Alberta with 101,883 square miles. The greater part of the southern portion, from the United States boundary for about two hundred miles north, is flat or rolling prairie, a large part being treeless.

The Province of British Columbia is heavily timbered and contains 372,630 square miles. The heaviest timber growth is found west of the coast range, and embraces an area of 100 to 150 miles wide and 700 miles long. There is little hardwood of any sort.

An interesting review of the lumber resources and situation of Canada was made some years ago by Mr. E. Stewart, Superintendent of Forestry of the Dominion of Canada. It is particularly of value as showing in a graphic way the important place which spruce holds and will continue to hold in the timber resources of the Dominion. While the policy of the Dominion, as expressed in its forest reserves and its method of leasing timber limits, whereby the title to the land is retained by the Government and cutting is done under restrictions, will undoubtedly prolong the productive life of the pine forests and perhaps enable them to contribute in perpetuity to the welfare of the nation, it is spruce which, to the greatest extent, will supply the demand for forest products and under intelligent direction will never be exhausted. Mr. Stewart said in part:

"Though we have lost vast quantities of timber by fire, still Canada undoubtedly stands at the head of those countries from which a future supply may be expected. It is true that our virgin white pine can not last very many years longer, but we have other varieties of great value. In British Columbia we have the Douglas fir, the cedar, the western

white pine, and a hemlock very much superior to our eastern hemlock, but above all we have the spruce, the most widely distributed of all our forest trees. If we visit the mills of the Maritime Provinces we find them cutting that timber for export to Europe, and so fast is its natural reproduction in the moist climate of the coast that the same territory can in the ordinary way of lumbering be recut about every twenty years.

"Starting west from the Atlantic in Nova Scotia we find the white and black spruce in all the older provinces and in all the districts of our Northwest Territories, while in the interior of British Columbia another variety, the Engelmann spruce, a very useful tree, is found in great abundance, and west of this and extending to the coast, the giant of this species is found in the Menzies or Sitka spruce,² which almost rivals in size and utility the giant Douglas fir of the same district.

"Not only is the range of the different varieties of the spruce bounded only by the Atlantic and Pacific on the east and west, but it also extends over more degrees of latitude than any other of our native trees, reaching practically across the whole country from its southern boundary up to the limit of tree growth, in some places extending beyond the Arctic Circle. It must not be inferred that the whole of this vast area is covered with merchantable timber, but on the other hand there can be no question that this country possesses an immense quantity of spruce timber which probably no other country can equal. A very large portion of it is growing on land which, from its rough character and also from its severe climate, is unsuited for the growth of agricultural products and should be kept permanently for the production of timber.

"In addition to the utility of spruce for lumber it is of all varieties the one best adapted for pulp, an article which is now being applied to such a variety of purposes that the demand for pulpwood is enormously increasing every year, and there seems little question that this industry is only in its infancy and that our northern forest regions with the unlimited water power they possess will in the not distant future be the home of important and lasting industries."

It would be interesting to know what the forest area of Canada means as to total present supply of commercial timber and the annual product which, under favorable conditions and intelligent management,

² The *Picea sitchensis*, known not only as above, but also as the tideland spruce. This is the spruce whose manufacture has been most actively prosecuted on Grays Harbor, Washington, a tidal bay on the Pacific Coast of the State.

might be expected for the future. Unfortunately, no estimate has been made, nor is likely soon to be made, as to these points that is more than guesswork.

According to the next preceding table, the forest area of Canada, not including Newfoundland and the Labrador Coast, is 1,351,505 square miles, equivalent to about 865,000,000 acres. Such an area, reasonably well covered with forest, has, in any event, enormous possibilities. If it should be admitted that it will average only 1,000 feet an acre of sawmill timber, the total quantity would be 865,000,000,000 feet. If the long period of 100 years were allowed for cutting this quantity for reproduction, we would have an annual production of 8,650,000,000 feet, or about one-quarter the present output of lumber and timber of the United States and a quantity about fifty percent greater than the output of Canadian mills and of hewn timber in its various forms. But if the period of cutting should be limited to fifty years, as, under intelligent forestry management it could be, the product would be increased to 17,300,000,000 feet annually without deterioration or diminution of the stand. If the estimate should be 2,000 feet of sawmill timber to the acre, the maximum product on the basis of fifty years' cutting would be nearly 35,000,000,000 feet annually, or more than is now produced by the United States.

Looking at the matter in another way, ignoring the territories, if there be taken the reported forested areas of Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba and British Columbia, there would be found a total area of forests of 654,553 square miles, or 418,914,000 acres. An estimate of 2,500 feet per acre of commercial timber would give a total of 1,047,285,000,000 feet, which, on the basis of 100 years' cutting, is equivalent to the product of 10,472,850,000 feet annually, or, on the basis of fifty years' cutting, would provide over 20,000,000,000 feet annually.

These speculations are extremely general, but they serve the purpose of pointing out the fact that Canada is enormously rich in timber resources and that the possibilities of long continued production are almost incalculable. To the estimates of sawmill timber should, of course, be added that timber which is of value in the shape of cordwood, poles, railroad ties, pulpwood and for miscellaneous uses, local or general.

CHAPTER V.

CANADA—FORESTRY AND FOREST RESERVES.

As will be seen in later chapters, forest management has almost from the beginning of European occupation attracted the attention of the law-making authorities of what is now the Dominion of Canada. Royal authority was exercised to preserve to the uses of the Crown certain classes of timber and to introduce, in a partial and inadequate way, something like forest management. But so vast were the timber resources of Canada that until comparatively recent years very little public interest was taken in the subject of forest preservation. The earlier efforts of Canadian authorities toward a rational protection of their forest assets are recounted in the chapters devoted to the Provinces of Quebec and Ontario, and in those chapters relating to other provinces these forestry matters find their proper place; but in 1900 was established the Canadian Forestry Association, which since that time has by its educational work among the people and by coöperation with the Government done so much to promote these interests of the Dominion that the organization is deserving of especial attention.

The primeval forests of Canada have been noted for their extent and richness ever since the first explorations were made; and this natural endowment of public wealth has been the source of a large and constant revenue to the Crown and to the Provincial governments, greatly lightening taxation, and in some sections almost obviating the necessity of taxation of any other form. The total value of the export of forest products for the fiscal year ending June 30, 1904, was \$36,724,445, while the census of 1901 placed the total value of forest products for the preceding year at \$51,000,000. The annual revenue received from the forests of Quebec and Ontario runs well up toward \$1,250,000. In 1893 the revenue from this source in New Brunswick totaled \$196,500, while in British Columbia an estimate made in 1905 for the year not then completed placed this revenue at \$250,000. Thus it will be seen that timber and timber products are of the highest importance not only to the individual operators, but to the welfare of the Dominion as a whole and to the Central and Provincial governments as well. Yet, as in other new countries favored by a heavy natural forest

growth, the Canadians, for a long time, considered their timber supply practically inexhaustible.

One of the most important dates in connection with the Canadian movement for intelligent forest control is 1882, in which year was organized, at Montreal, the American Forest Congress. At this forestry congress was present a large number of prominent representatives of lumber interests of Canada as well as of the United States. Many of them had prepared papers which they read and which led to discussions that attracted a large measure of public attention.

In itself this congress did not accomplish much for the cause of forestry, but it opened the way for a quickening of interest in the subject and helped to make further progress less difficult. Until that time, and indeed later, forestry had to contend with the idea that the forests were inexhaustible and, further, had to defend itself against a widespread charge of faddism. The majority of people totally discredited the idea that the supply of timber would ever be inadequate to the demand, and of those who considered that such a condition was a possibility, there were but few who were not content to let the future take care of itself, believing that if the time ever should come when lumber would be difficult to obtain because the supply of timber had been unduly diminished, that day was so far away from them and their needs that they were not called upon to take any action to prevent its coming.

Operating lumbermen also were to a certain extent offended and alienated from the cause by the radical utterances by most of the few persistent champions of forest preservation. Yet, in the light of later events, it is seen that these radicals, who successively pleaded with, threatened and abused those who did not agree with them, were doing the work of agitation which history has proved to be the forerunner of almost every reform. They stimulated the people to think along forestry lines, so that when facts in their support came to the surface they could be and were assigned to their logical place. And so annually the cause of forestry gained ground, until early in 1900 was organized the Canadian Forestry Association.

To Mr. E. Stewart, Dominion Superintendent of Forestry, more than to any other one man, is due the credit for the formation of the Canadian Forestry Association, for it was he who, on February 15, 1900, called the meeting at which the organization was recommended and as a result of which the organization actually was effected on March 8, 1900, in the City of Ottawa. The following officers were duly elected:

Honorary president, His Excellency, the Governor General; president, Hon. Sir Henri Joly de Lotbinière; vice president, William Little; secretary, E. Stewart; assistant secretary and treasurer, R. H. Campbell. Board of directors: Hiram Robinson, Thomas Southworth, Professor John Macoun, Doctor William Saunders, Hon. G. W. Allan, E. W. Rathbun.

Of the above the president, Hon. Sir Henri Joly de Lotbinière, was Lieutenant-Governor of British Columbia; E. Stewart, Dominion Superintendent of Forestry; Hiram Robinson, president of the Hawkesbury Lumber Company and president of the Canadian Forestry Association in 1903; Thomas Southworth, director of Forestry for the Province of Ontario; Professor John Macoun, of the Dominion Geological Survey, and E. W. Rathbun, member of the Ontario Forestry Commission.

The objects sought to be obtained by the association, as set forth in a statement signed by R. H. Campbell, of the Department of the Interior, were as follows:

"The preservation of the forests for their influence on climate, fertility and water supply; the exploration of the public domain and the reservation for timber production of lands unsuited for agriculture; the promotion of judicious methods in dealing with forests and woodlands; reforestation where advisable; tree planting on the plains and on the streets and highways; the collection and dissemination of information bearing on the forestry problem in general."

From the beginning the Canadian Forestry Association has been closely in touch with the Dominion and Provincial governments and especially with the Dominion Forestry Branch. The association might almost be said to be a department of the Government, so strong has been its influence upon governmental policies and legislation.

The organization of the American Forest Congress has been spoken of. Following the congress there was distinct advancement, both in the understanding of the necessities of the case and in the advocacy of remedial measures applicable to admitted evils.

The history of the forest had shown that fire was an enemy even more disastrous than the operations of lumbermen and the destruction wrought by settlers, wasteful as both had been, and every system of forestry has of necessity incorporated provisions for protection against this very serious menace. Beginning with Ontario, in 1885, all the Canadian provinces, except British Columbia and Prince Edward

Island, have adopted laws regarding this hazard and have established special fire ranging service. Experience has demonstrated this system to be effective in proportion to the thoroughness with which it has been operated. Before the installation of these fire warden measures hardly a summer passed that the air of the cities in eastern Canada was not fouled by smoke from vast forest fires, which destroyed an almost incalculable amount of valuable timber; but since this system has been followed fires have been comparatively infrequent and isolated. It is not claimed by anyone that perfection has been reached in guarding the forests from their greatest enemy, but certainly enough has been accomplished to make the position taken by those advocating this method of protection, unassailable. Ontario, which expends the greatest amount upon this service, spent in 1903 only \$31,237 in this manner, while the revenue derived from the Ontario woods in the same year was \$2,307,356. Thus, less than one and one-half percent of the forest revenue was expended for protecting the entire source of that revenue, which certainly is a low rate of insurance.

The growing recognition of the desirability of extending the Canadian forests resulted in the adoption, in the '80's, of the Tree Culture Claim Act. In 1889 experimental farms were established throughout the western country and experiments in tree growing began. From 1889 also dates the inauguration of the Dominion Forestry Branch which gave an added impetus to the forestry movement.

In all of these directions the Canadian Forestry Association has been helpful and influential. It has supplemented the work of public investigators, has upheld the hands of administrators and not only stimulated the Dominion and Provincial authorities, but inspired the people themselves to a quicker and more intelligent interest in the work. Since the organization of the association the protective force employed against fire has been increased and improved methods of management have been put in force. Rangers have been detailed in many sections where previously there were none. The forest reserves have been enlarged and increased in number. Through the medium of the agricultural college a plan has been put into operation in Ontario for aiding farmers to set out wood lots, the work of the experimental farms has been aided and all over the Dominion an interest has been aroused which has resulted in demonstrated benefits.

While the association does not claim that all these things have been done solely through its efforts, it should have part of the credit for

them, inasmuch as it has lent its active support to each and every movement for the furtherance of practical forestry work. The meetings of the associations are held early in each year in the leading cities of the Dominion. The officers for 1905 are as follows:

Patron, His Excellency, The Governor General; honorary president, Aubrey White, Toronto, Ontario; president, E. G. Joly de Lotbinière, Quebec, Quebec; vice president, E. Stewart, Ottawa, Ontario; secretary-treasurer, R. H. Campbell, Ottawa, Ontario.

Vice presidents for the provinces: Rev. A. E. Burke, Alberton, Prince Edward Island; Hon. J. W. Longley, Halifax, Nova Scotia; His Honor, J. B. Snowball, Chatham, New Brunswick; Hon. S. N. Parent, Quebec, Quebec; Lieutenant Governor of Manitoba, Winnipeg, Manitoba; His Honor, A. E. Forget, Regina, Assiniboia; William Pearce, Calgary, Alberta; F. D. Wilson, Fort Vermilion, Athabaska; Hon. H. Bostock, Monte Creek, British Columbia; Hon. J. H. Agnew, Winnipeg, Manitoba; Hon. Nelson Monteith, Ontario.

Board of directors: J. R. Booth, Ottawa, Ontario; Hiram Robinson, Ottawa, Ontario; Monseigneur Laflamme, Quebec, Quebec; William Saunders, LL.D., Ottawa, Ontario; Thomas Southworth, Toronto, Ontario; H. M. Price, Quebec, Quebec; Doctor Robert Bell, Ottawa, Ontario.

Education in forestry has not in Canada, as yet, taken the form of distinctive forestry schools, but, nevertheless, a good deal is being done along that line. Queen's University, at Kingston, Ontario, has of recent years supported a series of lectures on forestry, while the Mount Allison University, of Sackville, has had a course of lectures on forestry incorporated into its curriculum. The project of establishing schools of forestry has been under consideration by the University of Toronto and Queen's University. Perhaps the most practical work has been done by the Ontario Agricultural College, at Guelph, Ontario. Since about 1884 forestry has been taught in that school, there being open a special course in connection with the fourth year. This is a degree course, authorizing the graduates to entitle themselves foresters. The importance of schools devoted especially to forestry was recognized by the Canadian Forestry Association at its 1904 meeting, when the following resolution was adopted:

"Resolved, That the Ontario government be, and is hereby, requested to make a proper grant for the operation of a school or schools of forestry."

Perhaps the most practical work has been done in connection with experimental farms and stations. At Guelph, in 1904, was begun nursery work by growing deciduous varieties of trees from the seed. At Ottawa, Ontario, is an experimental farm and arboretum under the auspices of the Dominion government. The first planting of forest trees at this experimental farm was made in 1887. About twenty-one acres have been devoted to the planting of forest trees in belts and clumps and sixty-five acres additional have been used for the arboretum and the botanical gardens.

The Federal government has charge of the forests on Dominion lands proper. These embrace the Province of Manitoba, the Northwest Territories and also that part of British Columbia known as the railway belt, consisting of a stretch of country forty miles wide—twenty miles on each side of the main line of the Canadian Pacific railway—containing altogether about 20,000 square miles. It is estimated that the area of forest lands thus under the Dominion control, not including Indian reserves and the old provinces, is 742,578 square miles, while that under the control of the Provincial governments is 506,220 square miles.

The Dominion Department of Agriculture has a well arranged series of experimental farms, a feature of each of which is the study of tree growth. The central farm is at Ottawa, Ontario. The branches are at Nappan, Nova Scotia; Brandon, Manitoba; Indian Head, Assiniboia, and Agassiz, British Columbia. The most important experiments in some respects have been made at Indian Head. A shelter belt 100 feet wide has been planted along the western and northern boundaries of the farm, extending nearly two miles, while blocks of trees of from two to five acres each have been established. This experiment demonstrated the value of tree planting as a protection to crops and fruit trees and also as to what can be done in the way of growing trees on the open prairie in a comparatively dry climate. Furthermore, from the experiment farms are distributed tree seeds, seedlings and cuttings. The work of distribution to settlers was begun from Indian Head in 1899 and that is the headquarters for general distribution to settlers in the Northwest Territories, while the experimental farm at Brandon supplies those in Manitoba. The distributions up to 1904 to settlers in the northwest have been, from Ottawa, 600,000 seedlings and cuttings; from Indian Head, 290,000, and from Brandon, 610,000.

The Province of Ontario and the Dominion have each established a forestry office as a branch of the public service. The Dominion office

was started in 1899. The officers consist of the superintendent, assistant superintendent, inspector, several supervisors of tree planting and a number of forest fire rangers. Any land owner desiring to avail himself of the coöperation of the Government applies to its forestry branch. The land of the applicant is visited by one of the supervisors the following summer, when a plan of the proposed plantation is made. The next season seedling trees are sent by express from the government nurseries free of charge. The settler enters into an agreement to set aside a certain portion of the land as a permanent tree plantation; to prepare his soil carefully according to the directions of the supervisor; to plant the trees on their arrival and to cultivate them and keep the ground clean until the trees are of sufficient size no longer to need such attention. As stated above, seedling trees have been grown on the various government farms, but in 1904 the policy was inaugurated of centralizing the work, and 160 acres of land were obtained for a forest nursery station near Indian Head and buildings were being erected and preparations were made by which the supply for the whole northwest country would be grown at that place and distributed from thence.

CANADIAN FOREST RESERVES.

Notwithstanding the original immense forest wealth of Canada and the fact that that wealth still remains untouched in many sections, the saw and the ax have so well fulfilled their destructive mission—and that practically within so short a period as a century—that the Canadian government has recognized the necessity of setting apart national parks and forest reserves for the purpose of conserving its forestal wealth.

The denuding of the forests is not only not harmful but is absolutely economic in those sections where the soil is suitable for agriculture and where settlement is desirable; but there are large tracts in Canada, particularly in Ontario, Quebec and British Columbia, that are totally unfit for agriculture, and upon these tracts the timber will reproduce itself if given the opportunity. Therefore by restricting lumbering and permitting the young trees to attain full growth, an almost perpetual supply of timber may be insured. To this end Ontario and Quebec have established provincial reserves, and the Federal government has established national parks and reserves in Manitoba, in the Northwest Territories and in what is known as the forty-mile belt along the main line of the Canadian Pacific railway in British Columbia. This belt was ceded by the Province of British Columbia to the Federal government of Canada as a contribution toward the building of the

Canadian Pacific railway. With the exception of that in these provinces and territories and the Indian reserves all the timber in Canada belongs to the several provinces in which it is located.

The Federal reserves in British Columbia are Long Lake Timber Reserve, Yoho Park and Glacier Forest Park. Long Lake Timber Reserve occupies the central part (considering the east and west direction only) or dry belt of British Columbia, being eight miles southwest of the town of Kamloops, which is situated on the Canadian Pacific railway and the Thompson River. The mountains included in this reserve form a watershed for the numerous small streams which irrigate the farming lands of the surrounding valleys. This reserve contains a good growth of Douglas fir and black pine. It was set apart by order of the Minister of the Interior August 15, 1902, and has an area of 76,800 acres.

Yoho Park is the natural continuation of the Rocky Mountains National Park, in the Northwest Territories, but being on the British Columbia side of the interprovincial boundary, that is, on the western slope of the Rockies, it has a distinctive name. Its area is 530,240 acres. It was set apart December 14, 1901, by order in council.

Glacier Forest Park, a small reservation of 18,720 acres, set apart by order in council October 11, 1888, is located in the Selkirk Mountains, British Columbia, on the main line of the Canadian Pacific railway. Glacier station, a favorite resting place of tourists, is located on this reserve.

The Federal reserves in the Northwest Territories are as follows: Rocky Mountains Park, Foothills Timber Reserve, Waterton Lakes Forest Park, Cooking Lake Timber Reserve, Moose Mountain Timber Reserve and Beaver Hills Timber Reserve.

Rocky Mountains Park is situated along the eastern slope of the Rocky Mountains in Alberta, north of the Foothills Reserve, the southern end being about 120 miles north of the international boundary. This park is in the shape of a triangle, each side of which is about 100 miles in length, with the town of Banff, a well known mountain resort on the main line of the Canadian Pacific railway, in the center. The Bow River runs through the middle of the triangle. When first set apart by special act of the Dominion Parliament in 1887 this park was only twenty-six miles long and ten miles wide; but it was extended by act of 1902 and now contains approximately 2,880,000 acres. Together with Yoho Park, on the western slope of the mountains in British Co-

lumbia, this reservation forms one of the most magnificent forest parks in the world, the combined area being 3,410,240 acres, or over 5,328 square miles.

The Foothills Timber Reserve, containing 2,350,000 acres, set apart by the Minister of the Interior February 21, 1899, embraces the foothills on the eastern slope of the Rocky Mountains, in the southwest corner of Alberta, between the international boundary and Rocky Mountains Park. It stretches northward, from the South Kootenay Pass on the boundary, about 140 miles. The use of this reserve as a watershed is of much more importance than its use for the production of timber.

A foot or projection of 34,000 acres on the southern end of the Foothills Reserve is formed by the Waterton Lakes Forest Park, which was set apart May 30, 1895, as a tourist park, previous to the setting apart of the Foothills Reserve. It forms a square, one side of which is the international boundary.

Twenty miles southeast of Edmonton, northern Alberta, is the Cooking Lake Timber Reserve, having an area of 109,000 acres, and having been set apart June 6, 1899, by the Minister of the Interior.

Still following an eastward course, Moose Mountain Timber Reserve is the next in order. This is a small reservation in southeastern Assiniboia, about fifty miles due north of the town of Portal, which is on the "Soo" railroad at the point where it crosses the international boundary. Moose Mountain Reserve has an area of 103,000 acres, set apart under the same authority as the Foothills Timber Reserve.

In northeast Assiniboia, twenty miles west of the town of Yorkton on the northwestern branch of the Canadian Pacific railway, and about forty-five miles north of Indian Head on the main line of the Canadian Pacific, is the Beaver Hills Timber Reserve, which was set apart August 20, 1901. Its acreage is 170,000.

The Province of Manitoba possesses six timber reserves, namely, Turtle Mountain, Spruce Woods, Riding Mountain, Duck Mountain, Lake Manitoba and Porcupine Mountain.

Turtle Mountain Timber Reserve lies in the southwestern part of the Province, extending about twenty miles along the international boundary, at a distance of twelve miles north of the town of Bottineau, North Dakota, and fifteen miles southeast of Deloraine, Manitoba. It was set apart as a reserve July 13, 1895. Its area is 75,000 acres.

In the central part of the Province, lying for about twenty-five miles

along the south side of the Canadian Pacific main line, between the city of Brandon and the town of McGregor, is the Spruce Woods Timber Reserve, of 190,000 acres. It was set apart January 8, 1898, under the same authority as the Foothills Timber Reserve.

Riding Mountain Reserve is of irregular shape and extends about ninety miles from northwest to southeast, lying southwest of Lake Dauphin and in the fork formed by the main lines of the Canadian Pacific and Canadian Northern railways. It has an area of 1,215,000 acres, and was set apart July 13, 1895.

Directly north of the Riding Mountain Reserve, west of Lake Winnipegosis and lying parallel with the Swan River branch of the Canadian Northern railway, is the Duck Mountain Timber Reserve. It has a length of fifty miles from north to south and contains 840,000 acres. On February 5, 1902, it was set apart as a reserve.

A small reserve of 159,460 acres on the west side of Lake Manitoba is known as Lake Manitoba Timber Reserve. It is situated a couple of miles due west of the Hudson Bay Company's post, Manitoba House, at the narrows of Lake Manitoba, and a few miles northeast of the village of Laurier, which is the nearest railway station and is located on the Canadian Northern railway.

Porcupine Mountain Timber Reserve occupies the extreme north-western angle of the Province of Manitoba, forming a parallelogram, the adjacent sides of which are about forty and sixty miles, between Lake Winnipegosis and the northwest corner of the Province. On August 24, 1900, it was reserved from settlement only, timber licenses being permitted to be granted. Included within this reserve are 1,382,400 acres.

The national parks above described have been set apart on the lines of the United States national parks for the purpose of preserving the natural beauties intact, no cutting of timber being permitted. The reserves on the watersheds, as Long Lake Timber Reserve, the Foothills Timber Reserve and Waterton Lakes Forest Park, and some of the others to a lesser extent, have been set apart in order to preserve the forest-floor so that the water falling on the mountains may be fed gradually to the rivers below to give them a regular water supply as far as possible the year around. The remaining reserves have been set apart with two objects: First, to keep settlers out of broken and other lands unsuitable for farming, and, second, to preserve a supply of timber for the settlers who will occupy the adjacent prairie lands.

With these objects in view and partly owing to the short time since they have been set apart, no commercial lumbering has been allowed in them and consequently no regulations therefor made. The only existing regulations are those permitting settlers to secure licenses to cut a limited supply of timber for fuel and building purposes. Some of these reserves have been more or less burned and worked over, and the object of the reservation and the employment of fire rangers is to give the timber a chance to start growing again.

Outside of these reservations the Federal government of Canada has large areas of timber in Manitoba, the Territories and British Columbia, which are leased to lumbermen on the usual plan of a bonus and ground rent. The ground rent is \$5 a square mile for a year except for lands west of Yale, British Columbia, where the ground rent is five cents an acre. The Crown dues are, on sawed lumber, 50 cents a thousand feet board measure; railway ties, 1½ cents each; shingle bolts, 25 cents a cord, and five percent on the sales of all other products of the berth.

The Provincial governments of Ontario and Quebec have also set apart parks and reserves for the preservation of their forests, the regulations regarding which are made by the Provincial governments.

Sibley Reserve is in the northwestern part of Ontario, on the north shore of Lake Superior, and includes Thunder Cape and a portion of the township of Sibley. It contains about 45,000 acres, and was set apart in 1900 by order in council.

Situated in the district north of Lake Nipissing, Ontario, is Algonquin Park, on the height of land between the Ottawa River and its tributaries and the Georgian Bay waters. This park, having an area of 1,109,383 acres, was created by special Act of Legislature in 1893. It is not, in the strictest sense, a forest reserve, as it was primarily designed for a game preserve and much of its area is under license; but as no settlement is permitted within its limits it largely partakes of the character of a forest reserve. Permission is given to fish in this park, but hunters are absolutely forbidden, the rules in this respect being so strict that no man is even permitted to carry a gun in the park. At the time when this park was set aside game within its area was very scarce, but now it is fast becoming filled with fur-bearing and game animals.

One of Ontario's reserves more recently set aside is Mississauga Reserve, created in 1904. It lies to the north of Lake Huron and comprises an area of 8,000 square miles, or 1,920,000 acres. The policy of

the Government in regard to the administration of this and Temagami Reserve is that timber shall be disposed of by the thousand on the stump and cut under supervision of officials of the Government.

Temagami Reserve, containing 1,408,000 acres, was set apart January 11, 1901. Within its boundaries is a beautiful lake of the same name. Most of this reserve is still covered with virgin pine of great value. On December 18, 1903, an addition of 3,700 square miles was made to the north and west, giving the reserve a total of 5,900 square miles, or 8,776,000 acres.

North of the City of Kingston, Ontario, is the Eastern Forest Reserve, which was formed under the Forest Reserve Act in 1899 and which contains 80,000 acres. This area was lumbered over and afterward burned, but now has a heavy growth of young pine.

The Laurentides National Park, of Quebec, was created by Act of Legislature January 12, 1895, and contains 2,650 square miles, or 1,696,000 acres, lying to the north of the City of Quebec. Its northern boundary is the 48th parallel; its eastern, the St. Urbain road; its southern and southeastern, the rear line of the Seignior of Beaupré and ranges XI and XII of Stoneham and Tewkesbury; its western, the Fief Hubert and an imaginary line running to a point west of Grand Lake Batiscau, thence skirting the Quebec & Lake St. John railway a few miles east thereof to the intersection of the 48th parallel. This park was formed for the purposes of protecting the forests, fish and game; of maintaining the water supply, and of encouraging the study and culture of forest trees. Over a dozen large rivers rise in this park, and it has been described as being "peppered" with lakes, the waters of which are teeming with fish. A large portion of the timber of this reservation is under license, some of the limits being operated at present. Game is found here in abundance, and hunting is permitted in certain sections, also fishing, both under regulations.

On April 10, 1902, the legislative assembly of New Brunswick passed an act authorizing the setting aside of "a tract of land in some portion of the Province covered with forest, not exceeding 900 square miles in extent," to be known as the Provincial Park of New Brunswick. However, no action has as yet been taken establishing this forest reservation.

The following table contains a complete list of both Dominion and Provincial reserves, whether timber reserves proper or parks, with their respective areas, as they existed at the beginning of 1905:

CANADA—FORESTRY AND FOREST RESERVES. 77

SUMMARY OF CANADIAN FOREST RESERVATION.

Name.		Acres.
UNDER FEDERAL GOVERNMENT.		
Long Lake Timber Reserve.....	76,800	
Yoho Park.....	530,240	
Glacier Forest Park.....	18,720	
Total, British Columbia.....		625,760
Rocky Mountains Park.....	2,880,000	
Foothills Timber Reserve.....	2,350,000	
Waterton Lakes Forest Park.....	34,000	
Cooking Lake Timber Reserve.....	109,000	
Moose Mountain Timber Reserve.....	108,000	
Beaver Hills Timber Reserve.....	170,000	
Total, Northwestern Territories.....		5,646,000
Turtle Mountain Timber Reserve.....	75,000	
Spruce Woods Timber Reserve.....	190,000	
Riding Mountain Reserve.....	1,215,000	
Duck Mountain Timber Reserve.....	840,000	
Lake Manitoba Timber Reserve.....	159,480	
Porcupine Mountain Timber Reserve.....	1,882,400	
Total, Manitoba.....		3,861,880
UNDER PROVINCIAL GOVERNMENT.		
Sibley Reserve.....	45,000	
Algonquin Park.....	1,109,388	
Mississauga Reserve.....	1,920,000	
Temagami Reserve.....	3,776,000	
Eastern Forest Reserve.....	80,000	
Total, Ontario.....		6,930,388
Laurentides National Park, Quebec Province.....		1,696,000
Grand Total.....		18,760,008

ADDENDUM.

Since this chapter was prepared a new forest reserve has been set apart by the government of the Province of Ontario in the western part of that Province, called the Nipigon Forest Reserve. It is thus described: "Commencing at the southeast angle of the Township of Ledger, east of the Nipigon River in the district of Thunder Bay, thence due east astronomically twenty-two miles, thence due north astronomically ninety-eight miles, thence due west astronomically seventy-three miles, thence due south astronomically ninety-eight miles, thence due east astronomically to the southwest angle of the Township of Purdom, thence due east astronomically along the south boundary of the Township of Purdom, and along the south boundary of the Township of Ledger, a distance of fifty-one miles in all, to the place of beginning, containing by admeasurement seven thousand one hundred and fifty-four square miles." According to this description the southern boundary of the reserve is eight miles north of Nipigon station, on the Canadian Pacific railway, and Lake Nipigon is included in its area. There are the usual exceptions of lands already patented, Indian reserves, etc. The total area of the reserve, including water, is 4,578,560 acres, making a total reserved area in Ontario of 11,508,943 acres, including the exceptions and the water area contained in the Nipigon Reserve, and increasing the total acreage of forest reserves in Canada to 28,338,563 acres. The land in this new reserve is not especially adapted to agriculture, with the exception of a few tracts situated in the river valleys of the western part of the reserve, but is of value as a timber preserve. Spruce, tamarack, jack pine and birch are the principal trees. Large areas have been devastated by fire, but are being covered by a second growth, which will, in time, be valuable not only as pulpwood but as material for railway ties, which will doubtless be in demand in this section in the near future. On the Ombabika River, which, roughly speaking, bisects the northeastern angle of the reserve, there is still good timber, the pulpwood being estimated at 1,484,000 acres. In the vicinity of this river are to be found birch, spruce, poplar, jack pine, balsam and tamarack.

Numerous rivers flow into Lake Nipigon, which occupies the central part of the reserve, and will furnish power for manufacturing purposes when needed. So also, in larger measure, will the Nipigon River, which has a fall of about 250 feet within the reserve.

Large game is not plentiful in the reserve, owing to the hunting of the Indians and also to the fact that much of the country has been swept by fire. Small fur-bearing animals, such as the mink, beaver, otter, marten, muskrat and fox, are found in abundance.

Also, a reserve, containing about 2,500 square miles, has been set aside by the Province of Quebec in the Gaspé Peninsula.

CHAPTER VI.

CANADA—PRODUCTION AND TRADE.

The figures on record for the Dominion of Canada regarding lumber production differ somewhat from those of the provinces added together because the Federal Parliament itself controls the timber in the several territories which have not yet reached provincehood, and also controls some of the timber in the provinces, such as that on Indian reserves. Besides, the provincial statistics take account of the timber cut on Crown lands only, that is, lands belonging to the province, while the Federal statistics take in the timber cut on private lands as well.

The following tables of production are made up from the most reliable sources obtainable. Owing to the better equipment for taking the census in later years, the later the census the more correct it is likely to be. Thus in some cases what looks like a reduction may really be a more exact census. This must be true in some cases, since Canada's exports were never so large as now, nor was her internal development ever before progressing at such a rapid rate, and yet production in some lines appears lessened. The world's demand for forest products is increasing with the increase of population, and on a per capita basis as well, and Canada is one of the great available sources of supply.

FOREST PRODUCTS OF CANADA FOR THE YEARS STATED.

Square timber, cubic feet.	1881.		1891.	
	Quantity.	Value.	Quantity.	Value.
White pine.....	19,326,250	\$ 3,961,881	9,200,000	\$ 2,649,600
Red pine.....	2,602,500	426,810	1,406,500	276,237
Oak	5,672,900	1,954,420	1,900,000	798,000
Tamarack	4,653,500	558,420	3,665,000	513,100
Birch and maple	4,415,000	604,769	2,508,300	417,255
Elm.....	3,192,000	733,740	2,965,000	791,655
All other square timber.....	50,157,800	12,218,440	21,650,000	7,421,620
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Logs, feet b. m.				
Pine.....	2,232,440,700	18,529,258	1,499,052,800	12,741,950
Spruce and others.....	2,602,558,400	13,012,792	3,353,857,700	20,123,134

FOREST PRODUCTS OF CANADA FOR THE YEARS STATED—*Continued.*

Miscellaneous.	1881.		1891.	
	Quantity.	Value.	Quantity.	Value.
Spars and masts (pieces).....	192,241	\$ 173,017	323,140	\$ 274,669
Staves (M.).....	41,881	300,128	92,260	434,868
Lathwood (cords).....	98,311	491,598	293,412	1,467,060
Tanbark (cords).....	400,418	1,801,881	329,810	1,494,145
Firewood (cords).....	10,993,234	22,865,926	10,555,164	22,693,602
Fence posts (cubic feet).....			85,089,765	2,836,325
Railway ties (number).....			32,054,721	2,136,982
Telegraph poles (number).....			3,938,610	333,882
Pulpwood (cords).....			261,155	783,465
Shingles (M.).....			939,736	1,973,866

The following tables show the kind, amount and value of the forest products according to the census of 1901. The figures given first are for the whole of Canada, and are followed by those for the separate provinces. Newfoundland and Labrador are not included in the statistics for Canada as they are separate and distinct politically from the Dominion.¹

FOREST PRODUCTS OF CANADA—CENSUS OF 1901.

Number of sawmills, 2,075; value of products, \$50,805,084. Capital invested, \$55,605,666; number of wage earners, 51,549; wages for labor, \$11,118,666.

SQUARE, WANey OR FLAT TIMBER.

	Quantity. Cubic feet.	Value. \$
Ash.....	416,308	\$ 44,583
Birch.....	1,203,564	151,281
Elm.....	1,864,765	147,143
Maple.....	846,433	37,014
Oak.....	110,219	19,570
Pine.....	2,881,310	458,218
All other timber.....	5,914,314	622,503
Total.....	11,726,913	\$1,480,312

LOGS FOR LUMBER.

	Feet b. m.	Value. \$
Elm.....	82,241,000	\$ 658,881
Hickory.....	1,650,000	19,702
Hemlock.....	200,778,000	1,126,214
Oak.....	10,421,000	153,917
Pine.....	1,533,681,000	15,377,157
Spruce.....	1,040,676,000	7,345,819
All other logs.....	787,516,000	5,111,709
Total.....	3,656,963,000	\$29,793,399
Pulpwood (cords).....	660,034	2,168,509
Miscellaneous products.....		19,808,978
Grand total of values.....		\$53,251,198

¹ According to the census of 1901, Newfoundland contained 195 sawmills, valued at \$292,790; logs cut, 1,616,449; lumber sawn, 43,648,000 feet, the value of which was \$480,556, and 18,197,000 shingles.

LUMBER INDUSTRY OF AMERICA.

ONTARIO.

Number of sawmills, 847; value of products, \$25,672,424.

SQUARE, WANey OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Ash.....	231,494	\$ 24,663
Birch.....	78,986	8,564
Elm.....	1,259,174	136,787
Maple.....	194,304	21,564
Oak.....	76,025	13,023
Pine.....	1,044,439	212,219
All other timber.....	906,236	94,968
Total.....	3,790,658	\$518,668

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm.....	79,105,000	\$ 639,670
Hickory.....	1,445,000	17,304
Hemlock.....	84,175,000	482,447
Oak.....	8,842,000	126,901
Pine.....	984,352,000	10,116,667
Spruce.....	8,708,000	71,221
All other logs.....	167,994,000	1,820,558
Total.....	1,334,622,000	\$12,764,768
Pulpwood (cords).....	108,335	304,837
Miscellaneous products.....	.....	8,068,464
Grand total of values.....	.....	\$21,656,735

QUEBEC.

Number of sawmills, 622; value of products, \$10,891,688.

SQUARE, WANey OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Ash.....	176,547	\$ 19,023
Birch.....	556,484	74,115
Elm.....	82,655	9,061
Maple.....	80,273	8,585
Oak.....	10,263	2,123
Pine.....	1,132,957	212,859
All other timber.....	3,482,710	353,420
Total.....	5,520,889	\$679,190

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm.....	2,474,000	\$ 25,679
Hickory.....	151,000	1,999
Hemlock.....	38,121,000	274,218
Oak.....	595,000	10,080
Pine.....	445,036,000	4,587,543
Spruce.....	599,447,000	4,502,102
All other logs.....	206,031,000	1,445,018
Total.....	1,291,855,000	\$10,846,644
Pulpwood (cords).....	526,865	1,777,776
Miscellaneous products.....	.....	7,443,863
Grand total of values.....	.....	\$20,747,491

NEW BRUNSWICK.

Number of sawmills, 236; value of products, \$7,041,848.

SQUARE, WANey OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Ash.....	1,898	\$ 209
Birch.....	153,214	17,010
Elm.....	1,160	116
Maple.....	4,722	476
Oak.....	200	28
Pine.....	60,009	6,722
All other timber.....	99,472	9,923
Total.....	320,776	\$34,484

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm.....	491,000	\$ 1,560
Hickory.....	35,000	184
Hemlock.....	26,696,000	107,571
Oak.....	25,000	232
Pine.....	19,166,000	125,213
Spruce.....	182,759,000	1,099,302
All other logs.....	61,721,000	333,632
Total.....	290,893,000	\$1,667,694
Pulpwood (cords).....	14,486	37,577
Miscellaneous products.....	.....	1,295,860
Grand total of values.....		\$3,035,615

NOVA SCOTIA.

Number of sawmills, 228; value of products, \$2,940,107.

SQUARE, WANey OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Ash.....	3,502	\$ 373
Birch.....	332,126	47,783
Elm.....	410	38
Maple.....	46,439	4,124
Oak.....	22,261	4,164
Pine.....	98,577	12,923
All other timber.....	356,371	39,697
Total.....	909,686	\$109,102

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm.....	25,000	\$ 233
Hickory.....	16,000	166
Hemlock.....	48,877,000	237,814
Oak.....	881,000	15,207
Pine.....	18,955,000	144,907
Spruce.....	198,892,000	1,272,653
All other logs.....	26,784,000	168,956
Total.....	294,430,000	\$1,839,936
Pulpwood (cords).....	18,348	48,320
Miscellaneous products.....	.....	1,460,490
Grand total of values.....		\$3,457,848

LUMBER INDUSTRY OF AMERICA.

BRITISH COLUMBIA.

Number of sawmills, 75 ; value of products, \$3,985,177.

SQUARE, WANey OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Elm	11,000	\$ 1,100
Oak	890	89
Pine	35,482	4,990
All other timber.....	827,108	101,591
Total.....	874,477	\$107,770

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm	45,000	\$ 450
Hemlock.....	2,490,000	20,750
Pine	63,256,000	373,731
Spruce.....	23,676,000	153,405
All other logs.....	285,997,000	1,478,315
Total.....	375,464,000	\$2,026,651
Miscellaneous products.....	.....	499,736
Grand total of values.....	.....	\$3,634,157

MANITOBA.

Number of sawmills, 37 ; value of products, \$490,628.

SQUARE, WANey OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Oak.....	400	\$ 190
Pine	6,088	820
All other timber.....	29,458	3,159
Total.....	35,926	\$4,069

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm	96,000	\$ 1,241
Oak	73,000	1,459
Pine	7,000	78
Spruce.....	10,417,000	84,987
All other logs.....	28,458,000	277,665
Total.....	39,061,000	\$385,430
Miscellaneous products.....	.....	590,523
Grand total of values.....	.....	\$950,061

THE TERRITORIES.

Number of sawmills, 18 ; value of products, \$247,428.

SQUARE, WANey OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Oak.....	180	\$ 25
Pine.....	1,899	445
All other timber.....	168,429	15,174
Total.....	170,508	\$15,644

LOGS FOR LUMBER.

	Feet b. m.	Value.
Pine	2,880,000	\$ 28,836
Spruce.....	13,728,000	137,299
All other logs.....	8,126,000	67,202
Total.....	24,734,000	\$233,137
Miscellaneous products.....	.....	235,482
Grand total of values.....	.....	\$484,263

PRINCE EDWARD ISLAND.

Number of sawmills, 12; value of products, \$35,834.

SQUARE, WANey OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Ash.....	3,787	\$ 311
Birch.....	82,754	3,819
Elm.....	366	41
Maple.....	29,695	2,275
Pine.....	1,879	240
All other timber.....	44,583	4,671
Total.....	112,984	\$11,387

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm	5,000	\$ 48
Hickory.....	3,000	49
Hemlock.....	419,000	3,414
Oak.....	5,000	88
Pine.....	29,000	877
Spruce.....	3,048,000	24,850
All other logs.....	2,375,000	20,368
Total.....	5,884,000	\$49,139
Miscellaneous products.....	.....	224,542
Grand total of values.....	.....	\$285,038

An idea of the importance of the forest wealth of Canada as a source of revenue (the census of 1901 being taken as a basis for the estimation) may be obtained by the following quotation from Mr. E. Stewart, Superintendent of Forestry, in his report upon the forestry work in Canada :

It will be seen from the census of 1901 that an estimate is made of the area of forests and woodlands for each of the provinces and also for the Territories. That of Manitoba and the Territories is placed at 722,578 square miles. Add to this 20,000 square miles of Dominion territory in the railway belt in British Columbia, and we have 742,578 square miles as the total on Dominion lands. Probably about one-fifth of this contains merchantable timber, or say 150,000 square miles, or 96,000,000 acres. After thus reducing the area, and remembering that in addition to the timber suitable for lumber, a large part of it is covered with spruce valuable for pulpwood, it can scarcely be considered an extravagant estimate to place the merchantable timber, including pulpwood, at 2,000 feet board measure per acre, or in all 192,000,000,000 feet. We have thus arrived at a very rough approximation of the quantity of timber now fit for use on the lands owned and controlled by the Dominion.

At the lowest the value of such timber standing in the tree may be put at \$1 per thousand feet board measure; that would amount to \$192,000,000. This represents only what might be collected by the Government as a royalty, and forms but a small part of its value to the country as a whole. Much of the timber is growing on land unsuitable for agriculture, but where water power is abundant and with the power thus at hand this country should be without a rival in the manufacture of all articles in which timber forms the chief ingredient.

It may be said that a very large percentage of this timber is not at present available, and that consequently its value is overestimated, but when we consider the great appreciation in the value of timber limits within the last ten or twenty years and the scarcity of the world's supply for the future it is almost certain that the enhanced value that will be obtained in the future for what is now inaccessible will more than pay compound interest on the present estimated value.

The above estimate takes no account of the younger growth. In considering the potentialities of our forest areas their capability of affording a continuous crop should be kept clearly in view. Even under the discouraging conditions prevailing in our lumber regions after logging operations have ceased, it will be found in most cases that another crop, either of the original or other varieties, is fast springing up, and in my calculation of the value of a timbered territory, which is to remain permanently in forest, this growing crop should be taken into account.

Without going too minutely into this phase of the subject, I am of the opinion that if we confine our cutting of sawlogs to all trees above 12 inches at the butt and pulpwood to, say, 7 inches, the annual increment of growth fit for use will be not less than 140 feet board measure to the acre, or an annual growth increment equaling 13,440,000,000 feet, which at the above rate of \$1 per thousand stumpage, would give a perpetual annual return equal to \$13,440,000.

EXPORTS.

The next table, pertaining to exports, is taken from trade and navigation returns, and shows the ups and downs through which the Canadian lumber trade has passed. The figures are given from 1868 only, the year after confederation was formed, to 1903, but, going back a little before that time, it may be said that during the American Civil War there were high prices and a strong demand for Canadian lumber, which had free entry into the United States. About this time a large quantity of the finest white pine still stood on the southwestern peninsula of Ontario and between Kingston and Toronto. Masts, spars and square timber were sent to England and sawn lumber to the United States. About 1870 the trade in Ontario and Quebec became more restricted and centered in the Ottawa Valley, the Trent River and the districts southeast of Georgian Bay. In 1873 the total exports of forest products from Canada were \$29,397,534. This was the crest of the wave and a period of world-wide depression set in which lasted until 1879. In 1878 the timber exports stood at \$19,820,768 and in 1879

reached the low water mark of \$13,562,277. This was at a time when men's hearts failed them; big houses went to the wall and everybody wondered and feared for what might come next. That, however, was the nadir of the panic and by 1881 the timber exports had risen to \$25,374,336 where they stood off and on for ten progressive, prosperous years. The granting of free entry into the United States markets in 1894 did not much change things until 1897 when, owing to the duty being restored, \$15,435,759 worth of lumber was rushed in to avoid the higher duty. Progress since then has been steady, with the heaviest year on record in 1903.

VALUE OF EXPORTS FROM CANADA OF FOREST PRODUCTS FOR THE YEARS MENTIONED.

YEAR.	Products of the forest.		Other manufactures of wood not included in preceding columns.	Total of wood products to all countries.
	Raw.	Manufactured or partially manufactured.		
1886.....	\$5,550,694	\$12,711,476	\$ 551,958	\$18,814,118
1871.....	7,035,159	15,317,052	835,116	23,187,327
1873.....	8,592,550	19,994,268	810,718	29,397,534
1876.....	6,005,560	14,122,504	401,352	20,529,416
1879.....	2,922,272	10,339,187	300,818	13,562,277
1881.....	7,679,233	17,280,779	414,324	25,374,336
1886.....	4,909,400	16,125,211	637,591	21,672,202
1891.....	5,406,345	18,875,870	1,024,448	25,306,463
1896.....	6,022,173	21,153,513	1,555,108	28,730,794
1897.....	6,023,211	25,235,518	1,652,317	32,911,046
1900.....	4,495,786	25,167,879	3,127,242	32,790,910
1901.....	4,989,004	25,020,853	2,982,638	32,972,545
1902.....	4,469,459	27,649,940	3,189,843	35,309,272
1903.....	5,299,552	31,086,463	4,473,952	40,859,967

The value of exports of the products of Canadian forests from 1879 to 1903 was as follows: Lumber, \$467,088,774; square timber, \$73,299,685; logs, \$22,233,758; shingles, \$15,443,878; pulpwood, \$10,002,346; sleepers, \$6,966,198; shooks, \$4,216,298; firewood, \$6,544,347; bark, \$5,388,839; ashes, \$3,140,636, and all others, \$13,274,914. Total, \$627,599,673.

In connection with the above table we may note the relation that exports of forest products bear to the total exports of Canada. During the twenty-five years ended with 1903 the total value of exports of domestic products, not including coin and bullion, was \$2,737,658,211. The exports of forest products, therefore, were 23 percent of the total. While exports of forest products have shown a satisfactory increase as the years have gone on, the development of the country in agriculture,

mining and general manufactures has rendered them of less relative importance. The following table shows the percentage of exports of forest products to total domestic exports:

EXPORTS OF FOREST PRODUCTS, TOTAL DOMESTIC EXPORTS AND PERCENTAGE OF FORMER TO LATTER, IN YEARS NAMED.

Year.	Exports of forest products.	Total of all domestic exports.	Percent of forest products.
1868.....	\$18,814,118	\$57,567,888	34.4
1871.....	23,187,327	74,173,613	32.6
1873.....	29,397,534	89,789,922	32.7
1876.....	20,529,416	80,966,435	25.3
1879.....	13,562,277	71,491,255	18.9
1881.....	25,374,336	98,290,823	25.8
1886.....	21,672,202	85,251,314	25.4
1891.....	25,306,463	98,417,296	25.7
1896.....	28,730,794	121,013,852	23.7
1897.....	32,911,046	137,950,253	24.0
1900.....	32,790,910	191,894,723	17.0
1901.....	32,972,545	196,487,632	16.7
1902.....	35,309,272	211,640,286	16.6
1903.....	40,859,967	225,849,724	18.0

The following tables, also taken from trade and navigation returns, show the quantities and values of the forest products exported from Canada during the years mentioned:

QUANTITIES OF FOREST PRODUCTS EXPORTED FROM CANADA.

	1894	1896	1898	1900	1902	1903
Bark for tanning, cords....	30,602	87,188	26,498	16,124	34,897	16,769
Basswood, feet.....	522,000	996,000	1,209,000	*	*	*
Hickory, feet.....	279,000	865,000	16,000			
Firewood, cords.....	149,078	118,720	79,972	87,208	43,573	48,958
Knees and futtocks, pieces.	16,510	14,128	85,742	28,698	21,867	22,514
Logs, cedar, for shingle bolts, cds.....	355	600	700	5,602		21,032
Logs, elm, feet.....	28,500,000	18,961,000	8,483,000	10,127,000	6,978,000	1,781,000
Logs, hemlock, feet.....	5,233,000	4,761,000	1,121,000	1,824,000	5,906,000	4,980,000
Logs, oak, feet.....	796,000	298,000	120,000	225,000	146,000	119,000
Logs, pine, feet.....	279,707,000	157,449,000	186,049,000	50,865,000	15,242,000	11,705,000
Logs, spruce, feet.....	17,930,000	15,182,000	5,526,000	9,711,000	8,275,000	7,142,000
Logs, all other, feet.....	13,321,000	8,576,000	9,842,000	16,155,000	39,312,000	26,176,000
Lumber—						
Deals, pine, st. hd.....	65,654	84,194	78,228	71,754	66,191	87,318
Deals, spruce and other, stand.....	219,724	223,432	292,743	307,637	242,636	251,208
Deal ends, st. hd.....	16,614	17,911	22,228	19,765	15,273	17,208
Lath, pieces.....	349,906,000	422,966,000	334,971,000	345,978,000	420,147,000	474,437,000
Paling, pieces.....	2,567,000	1,683,000	2,855,000	5,066,000	849,000	381,000
Pickets, pieces.....	4,661,000	3,114,000	1,779,000	4,266,000	59,376,000	7,705,000
Planks and boards, ft...	1,134,231,000	813,529,000	514,609,000	842,454,000	984,062,000	954,241,000
Joists, feet.....	2,215,000	1,782,000	573,000	5,000	236,000	1,100,000
Scantling, feet.....	20,328,000	43,847,000	31,011,000	26,897,000	37,931,000	43,298,000
Shingles, pieces.....	338,586,000	465,731,000	565,759,000	609,209,000	781,160,000	798,277,000
Sleepers and ry. ties, pieces.	391,354	1,287,061	701,810	1,297,003	868,800	970,007
Stave bolts, cords.....	31,408	13,635	9,077	8,798	5,084	2,081
Timber, square—ash, tons.	5,497	4,509	2,685	11,495	3,065	2,098
Timber sq.—birch, tons....	16,408	26,969	16,137	24,750	10,597	19,663
Timber, square—elm, tons.	10,478	14,289	12,717	10,554	13,117	14,033
Timber, sq.—maple, tons...	73	26	195	480	268	146
Timber, square—oak, tons.	25,838	27,706	26,465	13,670	15,310	16,340
Timber, sq.—red pine, tons.	6,849	8,845	5,611	5,341	2,230	10,367
Timber, sq.—white pine, tons.....	109,312	91,280	86,661	73,108	47,686	58,632
Timber, sq.—all other, tons.	4,938	4,107	1,084	3,232	8,997	3,312

*Included in lumber.

VALUE OF FOREST PRODUCTS EXPORTED FROM CANADA.

	1894	1896	1898	1900	1902	1904
Ashes, pot and pearl.....	\$ 109,764	\$ 110,092	\$ 112,806	\$ 138,255	\$ 138,798	.....
Bark for tanning.....	148,078	177,010	106,067	61,899	100,861	\$ 66,906
Basswood.....	20,648	86,968	57,044	.....	.....	.....
Hickory.....	7,864	9,578	437	.....	.....	.....
Firewood.....	287,036	222,889	140,897	117,761	61,607	71,961
Knees and futtocks.....	11,673	9,816	14,175	19,991	18,540	12,680
Total.....	\$584,568	\$564,848	\$409,915	\$337,896	\$344,206	\$151,546
Logs, cedar, for shingle bolts.	900	8,458	800	18,222	.....	.....
Logs, elm.....	152,221	124,968	58,784	74,721	54,245	16,519
Logs, hemlock.....	19,769	18,607	4,080	7,788	82,604	88,892
Logs, oak.....	16,897	6,627	2,517	8,430	2,788	585
Logs, pine.....	2,459,864	1,423,989	1,616,671	494,811	176,684	80,806
Logs, spruce.....	107,282	86,075	83,885	68,078	68,565	69,110
Logs, all other.....	106,229	71,085	89,480	117,132	237,019	269,771
Total, logs.....	\$2,862,152	\$1,784,779	\$1,800,817	\$778,882	\$565,840	\$419,688
Lumber—						
Battens.....	5,152	86,267	20,860	27,811	116,944	89,287
Deals, pine.....	2,761,069	8,087,791	8,814,947	8,276,616	8,164,562	2,975,614
Deals, spruce and other..	5,667,681	6,579,746	7,918,366	8,287,960	7,451,148	7,930,444
Deal ends.....	484,324	520,646	641,043	564,869	472,015	407,989
Lath.....	498,755	492,224	848,378	479,891	746,015	.....
Palings.....	20,262	10,378	14,861	22,272	7,429	686,969
Pickets.....	83,154	25,798	18,062	30,448	87,207	.....
Planks and boards.....	7,947,001	8,513,419	5,611,537	9,611,278	12,568,991	12,707,912
Joists.....	17,052	14,747	5,229	49	2,848	624,838
Scantling.....	170,886	887,707	241,044	285,615	365,117	.....
Staves.....	641,077	701,983	401,083	549,816	801,047	207,490
Other lumber.....	415,655	653,001	243,672	660,741	836,975	886,706
Total lumber.....	\$18,561,518	\$19,972,702	\$19,278,552	\$23,746,761	\$25,620,288	\$26,006,818
Masts and spars.....	7,138	7,800	2,448	8,605	7,965	7,838
Piling.....	61,815	67,765	186,154	98,846	208,479	91,715
Poles, hop, hoop, telegraph and other.....	71,789	50,608	86,126	48,872	103,826	85,468
Posts, cedar, tamarack and other.....	66,717	60,949	23,374	24,898	32,556	24,890
Shingles.....	754,743	899,541	994,806	1,131,506	1,525,886	1,711,256
Sleepers and railroad ties....	181,766	218,622	101,191	221,906	182,198	188,881
Stave bolts.....	86,296	84,672	20,811	20,678	11,671	3,996
Shooks.....	106,239	126,610	117,434	261,857	370,406	843,461
Total.....	\$1,284,502	\$1,460,462	\$1,430,844	\$1,796,068	\$2,442,485	\$2,406,946
Timber, square—ash.....	70,548	51,891	28,617	89,486	43,984	10,686
Timber, square—birch.....	127,591	221,715	142,565	228,424	104,867	109,276
Timber, square—elm.....	140,867	187,278	175,846	160,715	248,253	160,086
Timber, square—maple.....	3,828	296	2,098	5,882	8,000	.....
Timber, square—oak.....	570,675	588,951	608,724	280,298	855,952	226,759
Timber, square—red pine....	74,458	108,026	59,687	63,296	30,894	33,386
Timber, square—white pine...	1,568,835	1,518,042	1,536,067	1,184,962	928,795	1,580,506
Timber, square—all other....	84,245	50,719	28,882	50,734	56,884	61,658
Total, timber.....	\$2,590,542	\$2,721,417	\$2,579,986	\$2,018,746	\$1,767,579	\$2,182,254
Wood, blocks and other for pulp.....	893,260	627,865	912,041	902,772	1,815,068	1,788,049
Other articles of the forest...	85,911	87,628	104,884	187,803	68,980	86,311
Grand total.....	\$26,862,448	\$27,166,686	\$26,511,589	\$28,768,668	\$32,119,866	\$32,990,067

* Included in lumber.

The preceding table shows the change by which less quantities of what may be called the raw products of the forests are exported, and larger quantities of the products of mills and factories. The effect of the prohibition of the exportation of logs cut from Crown lands in the eastern provinces is displayed in the figures on pine logs, while the wonderful growth in the pulpwood business is also potent in its effect on the reports.

The exportation of wood from Canada into the United States is increasing rapidly. The value of these exports during recent years was:

During the fiscal year ending June 30, 1898.....	\$ 9,840,524
During the fiscal year ending June 30, 1899.....	10,511,019
During the fiscal year ending June 30, 1900.....	14,087,088
During the fiscal year ending June 30, 1901.....	13,176,717
During the fiscal year ending June 30, 1902.....	16,682,183
During the fiscal year ending June 30, 1903.....	18,323,878

This shows an increase in 1903 over that of 1898 of \$8,983,354, even surpassing the export for the same period to Great Britain by \$30,001; and this in the face of the American duty. This certainly indicates the great market for wood material that the United States alone will afford Canada in the future.

During the year 1902 the pulp output of Canada decreased by 24,613 tons. There were thirty-five mills engaged in the industry, the output of which was 240,989 tons, of which 155,210 tons were mechanical pulps, 76,735 sulphite, and 9,044 soda. The value of the pulp in 1902 was \$4,383,182, of which there was exported \$2,511,644, as follows: To Great Britain, \$976,192; United States, \$1,598,139, and other countries \$17,333. The mills were operated chiefly by water power.

The following shows the exportation of wood goods from British North America to the United Kingdom during the years named:

Year.	Timber. Loads.	Sawn and planed lumber. Loads.
1895.....	124,936	1,167,947
1896.....	151,102	1,456,179
1897.....	157,432	1,979,155
1898.....	108,554	1,644,830
1899.....	114,794	1,751,453
1900.....	113,843	1,688,033
1901.....	90,042	1,517,194
1902.....	78,917	1,639,668
1903.....	66,559	1,507,530

Notwithstanding the enormous wealth of Canada in forest resources and the heavy exports of forest products, the Dominion does, nevertheless, find it convenient to import no small amount of material, most of which comes from the United States. The following table shows the importations of wood and wood products for 1904:

IMPORTS INTO CANADA, BY COUNTRIES, 1904, FREE OF DUTY.

Articles.	Great Britain.	United States.	All countries.
Corkwood.....	\$ 4,350	\$ 54,419	\$ 78,357
D shovel handles.....	110	45,776	45,886
Pellies, hickory.....		27,610	27,610
Bolts, heading, etc.....		29,376	29,376
Billets, hickory.....		4,007	4,007
Spokes, sawn to shape.....		2,612	2,612
Spokes, rough turned.....		178,603	178,603
Hubs for wheels.....	3	24,071	24,074
Railroad ties.....		202,887	202,887
Logs, round.....		395,984	395,984
Lumber—			
Cherry, etc.....		456,479	457,419
Mahogany.....	11,494	126,894	138,388
Oak.....	41	1,492,536	1,492,577
Pitch pine.....	5	302,370	302,375
Walnut.....		57,770	57,770
Ash.....		97,479	97,479
Timber, hewn or sawn.....	419	324,864	326,760
Boards, planks, etc., partly dressed.....	155	2,658,006	2,658,571
Lath.....		58,779	59,091
Shingles.....		22,141	22,141
Staves.....		146,566	146,580
Firewood.....		112,631	112,631
Total.....	\$16,477	\$6,821,860	\$6,877,142

It will be noted in the above that the importations have been of hardwoods, in the form of lumber, timber and partially manufactured materials and of miscellaneous lumber not clearly specified.

The importations of hardwoods are due to the partial denudation of the hardwood districts of the Dominion spoken of previously. Many of the hardwood importations are of materials for manufacture. In addition, considerable quantities of ordinary building lumber are imported, owing to the fact that for some sections the American sawmills furnish a convenient and economical supply. Such has been the case in Manitoba and the Canadian Northwest, which have drawn heavily upon United States mills, especially upon those in Minnesota and, in recent years to some extent, upon those in the far northwestern states, for the construction of houses, barns and business buildings in the development of that comparatively new country. In the older provinces it has been found desirable to import from the United States such items as pitch pine, used where a wood of strength is desired, and house finish, such as flooring. Therefore, while the exports of Canada are much heavier than its imports, it has imported material from the United States to the value of \$6,820,000. This heavy importation is made possible by the fact that the products of the forest are on the Canadian

free list ; but in recent years, and especially in 1904, an agitation began for an imposition of duty upon sawed lumber, with particular reference to supplying the needs of Manitoba and the Canadian Northwest from Canadian mills in western Ontario and in British Columbia, to the exclusion of the mills of Minnesota and of Washington and other far western states.

CHAPTER VII.

CANADA—COOPERAGE STOCK INDUSTRY.

Almost since the beginning of timber and lumber exportations from Canada the manufacture of cooperage stock or material therefor has been one of the leading of the minor forest industries. Easily accessible to waterways, all the way from Quebec to Lake Huron were originally immense quantities of timber suitable for this purpose. The oaks, and other woods used in the manufacture of cooperage stock, which grew in Canada compared very favorably with those of the United States, and, as intimated above, they were for the most part more accessible, though for scores of years the industry in the United States has been growing to magnificent proportions, feeding upon the resources reached not only by river, but by railroads. The Canadian cooperage stock industry, however, antedated that of the United States and was maintained in large proportions until the cutting away of timber compelled a reduction in its magnitude.

The more recent history of the Canadian industry is indicated to some extent in the figures of production contained in the preceding chapter, but a more reliable measure of its importance and fluctuations is found in the export statistics, out of which the following brief table has been compiled. The maximum of exportations, and presumably of manufacture likewise, was reached about the middle of the last decade, since when there has been an almost uniform decline, until, in 1904, the total exports of staves, heading and stave bolts were valued at only \$211,485.

EXPORTS OF STAVES AND STAVE BOLTS FROM CANADA.

Year.	Staves and heading. Value.	Stave Bolts.	
		Cords.	Value.
1881.....	\$300,128		
1891.....	434,868		
1894.....	641,077	31,403	\$86,296
1895.....	638,272	24,167	64,802
1896.....	701,993	13,635	34,672
1897.....	699,381	13,827	38,634
1898.....	401,083	9,077	20,811
1899.....	527,131	5,328	12,372
1900.....	549,816	8,793	20,673
1901.....	438,973	3,223	7,217
1902.....	301,047	5,034	11,671
1903.....	284,482	2,081	5,337
1904.....	207,490		3,995

The cooperage stock industry of Canada is not of sufficient importance to demand much space in this work, but a few pages may well be devoted to a review of the industry from historical and technical standpoints, prepared by a man who is one of the leading exporters of this class of material either in Canada or in the United States. His review of this subject¹ occupies the remainder of this chapter :

A great many years ago, when the principal exports from Canada to the old country consisted of furs and timber, some enterprising Frenchman (or possibly Scotchman), who had come from the motherland, being employed in the manufacture of barrels and casks, conceived the idea of getting out staves and heading in Canada for export to Great Britain. In those days the forests contained a great deal of fine white oak all the way from Quebec to Windsor, but more especially in the western peninsula, and those trees were cut down, squared up with a broad-ax and shipped to England, the consequence being that only the finest trees were used and only part of them, namely, the part that could be put into square timber.

This square timber was floated down to Montreal, loaded on vessels there for the old country, where it was used for the manufacture of lumber, and, I presume, staves also. This enterprising Frenchman or Scotchman no doubt saw the terrible waste which occurred by only using certain parts of the trees, and also saw the trees which were passed as not fit for square timber, but which would make excellent staves and undoubtedly this was the commencement of the cooperage industry in Canada.

Staves were taken out for the wine casks of France and Spain, and the whisky casks of Great Britain and Ireland, and before long "Canada butts" and "Quebec pipe staves" became standard grades in Great Britain and on the Continent.

At that time all of the sugar used in England came from the West Indies and was shipped in hogsheads, and the West Indies hogshead staves were also manufactured in Canada, shipped to England, where they were made into shooks and sent over to the West Indies to be filled with sugar, molasses and rum.

As the oak got scarcer in the east, the hewers and stave makers drifted west, until Chatham, Ontario, became one of the great centers of the stave industry.

The old residents here have told the writer that years ago McGregor

¹James Innes in the *Canada Lumberman*, January, 1906.

Creek and Thames River, which converge at Chatham, would have its waters covered for miles every spring with square oak, walnut timber, Canada butts, Quebec pipe staves and West India hogshead staves, and the smaller and shorter pieces of oak, utilized for barrel keg staves and heading. These were loaded on vessels in the Thames River, sent down to Montreal, and in some cases sent direct to England from Chatham. This, of course, was entirely tight barrel stock, as in those days no slack barrel stock was exported from Canada, as being all made by hand it was too expensive to send over to the old country, which at that time was almost entirely supplied with norway fir staves and beech staves made from the timber growing in England, Ireland and Scotland.

Mr. Neil Watson, of Mull, Ontario, now a manufacturer of slack barrel stock, hauled staves from Harwick township to Buckhorn Beach for years and sold his pipe staves, 60x5x2, at \$25 per thousand, and West India staves, 44x4½x1, at \$5 to \$8 per 1,200 for shipment to England.

Tight barrel stock in Canada is now almost a thing of the past, the oak having been almost exhausted, and what staves are made here now are used entirely for local consumption, either being made in the old way, which I will describe, or being sawed on a drum saw.

The method of manufacture in the early days, in fact it is still in use, was to cut the trees up into bolt lengths, according to the quality of the tree, whether suitable for long or short staves or heading, then to split these bolts with a frow knife, and in some cases, such as "Canada butts," dress them with a draw knife and ship them in the rough, sometimes taking the sap off, but other times shipping them with the sap on. Now most of the oak staves are sawn on a drum saw, which does away with a great deal of waste, on account of the slips on the part of the workman with the frow, and also enables the manufacturers to use tougher oak and timber which would not split freely with a frow, in fact, work up everything very close. The buck, for bucking staves, never got much of a foothold in Canada, as the timber was practically exhausted here before buck staves were salable on foreign markets.

Oak heading, instead of being split now, is sawed, and while in the old days the head used to be split, finished off with a draw knife, marked off with a compass and sawed out by hand, the bevel also being put on with a draw knife, the heading is now sawed on a swing saw, piled in the yard to dry, put through a kiln when partially seasoned, run through

a planer and turned up with a rounding machine, which puts on the bevel and turns the head at the same time. As already stated, the manufacture of tight barrel stock in Canada from oak is now almost a thing of the past, and does not figure very much in the export trade of Canada.

We will now turn to the manufacture of slack barrel stock. Years ago when the manufacturing industries in Canada were in their infancy and the consumption of barrels was a very minor matter, coopers made their staves and heading for flour and other slack barrels in the same manner as they used to make their tight barrel stock, in fact the same as a great many tight barrel staves and heading are still made in the United States.

The cooper would get his bolts in the winter, haul them to his cooper shop, split out his staves with his frow, and in the winter make the staves with a draw knife, jointing them on a planer jointer, in some cases even putting on the joint with his draw knife. At that time slack barrel staves were made almost entirely from red oak and basswood, the cooper making his staves during the winter months in his shop, seasoning them inside his barn or cooper shop, and making up his barrels as required, and after the staves were seasoned selling them from seventy-five cents to \$1 each. Coopering at that time was simply a side issue, the cooper being also a farmer, carpenter, or some other tradesman, and making all kinds of barrels and casks from a flour barrel to a water tank.

Years rolled on, the red oak forests of Canada became a thing of the past—what oak was left would bring very much higher prices for lumber or bending purposes, sawn timbers, etc., than it would bring for staves, and the same applied to the States of New York, Ohio and Indiana, which at that time were large stave producers. Some Yankee genius (sad to say, unknown), possibly a man who thought there was a great waste of energy in making staves by hand, got his brains to work and invented the modern stave knife for cutting slack barrel staves from steamed bolts. The machine as at first invented is practically the same as is in use at the present time, the only improvements that have been made being that the machine is made twice as heavy as formerly, so as to be rigid and do away with the cutting of thin staves, and a balance wheel was put on so as to make the strokes more regular, and the speed increased from fifty revolutions per minute, which was the original cut of the machine, to 150 or 160 revolutions per minute, which is the speed at which the modern stave knives are run.

When this machine was first in use the staves were made entirely from red oak and basswood, the bolts being split out with a frow or ax, brought to the mill in this way and cut into staves. Immense elm forests then attracted the attention of some of the stave manufacturers and they experimented with making elm staves. It is not a great many years ago, only since I came to this country, that red oak staves were the principal kind used on the Minneapolis market, now elm is almost entirely used, in fact red oak staves are not liked on account of being so hard to work.

For a great many years nothing but split bolts were used, until some manufacturer, with a sawmill attached, conceived the idea of sawing his bolts, but until fifteen years ago staves made from sawn bolts commanded a lower price than staves from split bolts, as the coopers were of the opinion that staves could not be made straight grained unless the bolts were split, and it took a great many years to remove this erroneous idea. Now there is hardly a mill in the country making staves from anything but sawed bolts, and elm is the principal timber used, in fact is considered always desirable to any timber at the present time, although birch, beech, maple and southern woods are now crowding elm by degrees off the market, on account of the high price of elm stumpage.

We will now turn to the hoop industry. Until about twenty years ago all of the barrels were hooped with what is known as half-round hoops. The cooper cut these hoops in the winter, hauled them to his cooper shop, and spent the long winter months when not making staves in making hoops for his summer trade. Then the racked hoop made from black ash came into vogue, this being the precursor of the modern patent cut elm hoop. For a great many years the hoops were made either racked or split from elm, and finished with a draw knife, until the idea was conceived of cutting the hoops the same as staves from elm plank, and this hoop was found, when it was perfected, to be superior in every way to the racked or bark hoop. It is still the principal hoop on the market, although on account of the scarcity of elm a great many wire hoops are being used to supplement the elm hoops on the barrels. The iron hoop alone does not give sufficient rigidity to a barrel, and if not supplemented with the patent hoop, the barrels when stored on the bulges would collapse without the assistance of the elm hoop.

Heading, which formerly used to be made in the same way as

staves, split from bolts, dressed off with a draw knife, in fact the same as tight barrel heading, are now sawed on a swing saw, kiln dried and turned on a turning machine, at the rate of 3,000 sets per day to one machine, whereas formerly it was a very good cooper who would turn out twenty-five heads in a day.

While the tight barrel cooperage industry of Canada has declined, the slack barrel industry has leaped up until it is one of the most important industries in Canada, millions of dollars being invested in stave, hoop and heading mills all over the country from Nova Scotia to Ontario, and barrels being used for almost every conceivable purpose, as they are the handiest, strongest and best package that has yet been invented by man.

There is no doubt but there is timber in parts of Canada which are yet undeveloped to continue this industry for a number of years, and no doubt before the supply is exhausted methods of reforestry will be inaugurated by the Canadian government the same as are in vogue in Norway and Sweden. It is one of the greatest industries we have in Canada and should be fostered so as to continue in perpetuity.

CHAPTER VIII.

QUEBEC—TIMBER HISTORY AND ADMINISTRATION.

Though the lumber industry in the Provinces of Quebec and Ontario in the Dominion of Canada is, so to speak, a double tree, growing from one root, it may be well to consider them separately, passing lightly over that part in each which more fully describes the other. The history of the industry could not be otherwise than interwoven in these two Provinces because from the beginning of things¹ until 1791, whether under French or British rule, they constituted one colony, and from 1841 to 1867 they were again united in the Union of Upper and Lower Canada. In the latter year these two Provinces, so different in language, religion, thought and habits, were the basis of that confederation which bound all the scattered colonies of Great Britain in North America (excepting Newfoundland) into an independent auxiliary nation, with complete self-government, with national responsibilities, and national aspirations; as Kipling sings

Daughter am I in my mother's house,
But mistress am I in my own.

That confederation would have been impossible but for the mutual forbearance—the give-and-take—between these two great Provinces which now, after a generation of expansion in greater Canada, still contain about seven-tenths of the total population of the country, a forbearance whereby the solid, Protestant, English-speaking Ontarian and the dashing, Catholic, French-speaking Quebecer have, as in a marriage contract, agreed to take each other for better or for worse, for all time; and, having made up their minds to it, find each other not such bad partners after all—in fact, preferable to any other of whom they know.

Moving across the stage of Canada's history, crowded with com-

¹ In 1534 Jacques Cartier entered the Gulf of St. Lawrence, visited different coasts around the Gulf, and took possession of the country in the name of "the most Christian king," Francis I., King of France. In the same year Cartier was appointed Captain General of Canada, which title he held for six years. In 1535 he explored the Gulf of St. Lawrence, landed at Quebec and sailed as far as the Indian village of Hochelaga, now Montreal, which he visited. After unsuccessful attempts at colonization by the French under Cartier, Roberval, La Roche and others, the first permanent settlement was effected at Port Royal under the direction of Champlain, in 1605. The City of Quebec was founded in 1608 by twenty-eight settlers, including Champlain. Montreal was founded by Champlain in 1611, the site being chosen by him as a favorable place for a new settlement higher up the river than Quebec.

manding figures, there is none more picturesque than that of the lumberman, beginning with the cavalier seigniors of New France, continuing with the haughty admiralty officers of old England, with their retainers singing French-Canadian boat songs, or fighting and praying as became good Glengarry covenanters, on through the stirring times of the rebellion of 1837 to the present time when, in the midst of a world of timber dues and percentages, the successful lumberman still builds his palace in the wilderness and becomes known as the King of the Gatineau or the Prince of Petawawa.

Nothing comes out more clearly in the early history of colonization in Canada than that the tree was considered man's enemy, and only valuable as a barricade against other enemies, climatic or human.

The idea of those who colonized New France was to reproduce the conditions of lord and vassal, which they thought to be eternal but were only accidental and were passing away in the old France even while they were vainly striving to reproduce them in the new. By this system the land was divided into large blocks, as large as a modern township, or small county, and each block given to a scion of a noble house who colonized his tract with tenants or retainers. These, in return for occupancy of the land, not only paid rents but performed many personal services, while the seignior on his part was invested with many privileges; among others, that of hunting over the retainer's land and of administering justice.

The place which timber occupied in this system may be best seen by examining one of the old seigniorial grants made in 1683 by the governor and indendant of Quebec, which embodies the usual conditions. No excuse is made in presenting it because it is a land grant, for from the beginning to the present time land and timber regulations have gone hand in hand:

We, in virtue of the power intrusted to us by His Majesty [the King of France] and in consideration of the different settlements which the said Sieur de la Valliere and the Sieur de la Poterie, his father, have long since made in this country, and in order to afford him the means of augmenting them, have to the said Sieur de la Valliere given, granted, and conceded the above described tract of land, to have and to hold, the same himself, his heirs and assigns forever, under the title of fief, seignory, high, middle and low justice and also the right of hunting and fishing throughout the extent of the said tract of land; subject to the condition of fealty and homage which the said Sieur de la Valliere, his heirs and assigns shall be held to perform at the Castle of St. Louis in Quebec, of which he shall hold under the customary rights and dues agreeably to the Custom of Paris; and also that he shall keep house and home and cause the same to be kept by his tenants on the

concessions which he may grant them ; that the said *Sieur de la Valliere* shall preserve and cause to be preserved by his tenants, within the said tract of land the oak timber fit for the building of vessels ; and that he shall give immediate notice to the King or to Us of the mines, ores and minerals, if any be found therein ; that he shall leave and cause to be left all necessary roadways and passages ; that he shall cause the said land to be cleared and inhabited, and furnished with buildings and cattle, within two years from this date, in default whereof the present concession shall be null and void.

This extract shows that the only interest the Crown took in the matter was the securing of an ample supply of oak for building ships for the royal navy. Later grants reserved timber for spars and masts, doubtless pine timber. From time to time, as war vessels were built or repaired at Quebec, permits were issued to parties to cut the oak timber reserved as above and regulations were made for rafting it to Quebec. Again, when new districts were opened in which oak timber was reported to be abundant, regulations were issued forbidding anyone cutting it until it had been examined and suitable trees had been marked for the navy. The penalty for violation of this regulation was confiscation of the timber and a fine of ten livres for each tree.

These first reservations caused trouble between the cultivator and his over-lord or the Government, as similar arrangements have done ever since in every part of the continent. If oak trees were numerous the tenant had either to destroy them or fail to fulfill his obligations to clear the land in a given time. The usual way of cutting the Gordian knot appears to have been to burn the timber ; but after suits by seigniors against settlers who made the trees into boards for their own use, it was ordained by the governor that the tenant should be unmolested where the timber was cut in the actual extension of his clearing ; but where the trees were cut for timber without the intention of clearing the land the party should be fined.

When the land became a little more cleared, trespass by settlers upon adjoining lands to cut suitable sticks or easily reached timber became more common and was punished by confiscation of the trucks and horses used to transport the wood and by a fine of fifty livres. In the district about Quebec City, one-half the fine and confiscation went to the proprietor of the land and the other half to the *Hotel Dieu* (hospital) of Quebec City.

At first the Crown reservation of timber was solely for naval purposes, and timber taken for military purposes, such as the building of casemates, was paid for by the Crown ; but later the reservation was

extended to include all timber the King might require. While the right of the King was thus defined, the rights of the seignior were undetermined and continued to be exercised conformably to Old World custom, with more or less exactness, according to the strength of mind of the seignior and the power of resistance of his retainers. These seigniorial rights lasted long after British occupation and were extinguished only by compensation, by the Seigniorial Tenures Act, of 1854. The court which heard the claims decided that the seignior had no right to timber for firewood for his own use, or to merchantable timber or timber for churches; as to whether he had the right to timber for manor house and mills, the court was divided. So that in the closing years of the French regime the Crown reserved the timber it required for its own use, and prohibited trespass, while the seignior reserved what timber he could for himself by the exercise of his will power over the tenant.

With the beginning of British occupation, in 1763, the policy of reserving timber for naval and military purposes inaugurated by the King of France was continued by the King of England, and somewhat extended. The first governor under the new regime, John Murray, was instructed to make townships containing about 20,000 acres, and in each township he was to reserve land for the erection of fortifications and barracks, where necessary, and more particularly for the growth and production of naval timber. He was further instructed to make reserves about Lake Champlain and between that lake and the St. Lawrence, because it had been represented to the King that the timber there was suitable for masting and other purposes of the royal navy and because it was conveniently situated for water carriage. He was to prevent waste and punish any persons cutting the timber and to report whether it would be advisable to prevent any sawmills being erected in the colony without license from the governor or the commander-in-chief. The modern school of forestry experts is inclined to regret that these instructions as to reservations in each township and permanent pine reserves on lands suited to pine were not carried out, the reason being that other urgent matters occupied the governor's attention and subsequent exploration showed the so-called illimitable extent of the pine forests.

In 1775 Guy Carleton, captain general and governor in chief, received like instructions, and in 1789 fuller regulations for the conduct of the land office were made, preserving the timber to the Crown, confining grants to individuals to lands suited to agriculture, and preventing

individuals from monopolizing such spots as contained mines, minerals, fossils and water powers, or spots fit and useful for ports and harbors and works of defense. These were to be reserved to the Crown.

If these regulations had only been carried out, how much would posterity have been saved! The seignior, with his plumed hat, his ruffles, his sword and turned-down top boots, as the sculptor represents him on the public squares of Montreal, had disappeared and his place was taken by a less artistic but more active individual, the royal admiralty contractor. Licenses to cut timber were granted by the British government to contractors for the royal dockyards, and these, in addition to getting out timber to complete their own contracts, took advantage of the opportunity to do a general business in supplying the British markets. The timber was still considered of such small value, above the cost of transport, that these were apparently not felt to be serious abuses by the colonists of that day.

EFFECT OF BRITISH IMPORT DUTIES.

A new era dawned for the Canadian timber industry with the close of the Napoleonic wars. In 1787, by a consolidation of the duties on timber coming into Britain, the rate was fixed at six shillings and eight pence per "load" of fifty cubic feet upon foreign timber imported in British ships, with an addition of two pence in case the shipment was made in a foreign ship. With the increased taxation necessary to carry on the wars to checkmate Napoleon's ambitious schemes, the duties rose steadily until, in 1813, they were £3 4s 6d a load, with 3s 2d additional when imported in a ship flying a foreign flag. The decline in the duties began again in 1821 when they were fixed at £2 15s a load, with 2s 9d additional for importation in a foreign vessel. Then for the first time a duty of 10s a load was imposed upon colonial timber, which had been theretofore free. However, as the colonies still enjoyed a preference of 45s a load, that did not stop the progress the colonial timber trade was making. This was shown by a report presented to a British parliamentary committee in 1833, to which was submitted the whole question of timber duties. This report shows that the earlier duties levied were not sufficiently large to overcome the prejudice which existed in favor of Baltic timber.

The first noticeable change was in 1803, when the imports from British North America reached 12,133 loads, compared with 5,143 loads the previous year. How small was the colonial trade is shown by the fact that the importations of European timber amounted to 280,550

loads. In 1807 the colonies supplied 26,651 loads as against 213,636 from Europe, and in 1809, for the first time, the colonial product exceeded that from Europe, the figures being 90,829, and 54,260 loads respectively.

The War of 1812 had a depressing effect upon colonial trade and Baltic timber again took the lead until 1816, when the colonies supplied twice the quantity sent by Europe. This was a period of expansion in Britain, so that the total trade as well as that with Canada shows great growth. In the five years from 1819 to 1823 the average annual import into Great Britain was 452,158 loads, of which 166,600 came from Europe and 335,556 from the colonies. The succeeding five years showed still further growth to a total yearly average of 602,793 loads, of which 410,903 came from the colonies, although in 1821 the duties on foreign timber were reduced and a duty of ten shillings a load imposed on colonial timber.

This is the first place where we hear of the United States. In 1819 duties were imposed by Canada upon goods coming from the United States, but flour, oak, pine and fir timber for export were allowed to come in free. The meaning of this was that a good deal of timber was brought in from the United States and reshipped from Quebec to the British market in order to obtain advantage of the preferential tariff in favor of the colonies. The extent of this trade attracted the attention of the British authorities, who had no intention that United States producers should avail themselves of a preference intended to help the colonies.

In 1820 an official inquiry was instituted by the British House of Commons which showed that the timber imported into Lower Canada from Lake Champlain from 1800 to 1820 included 10,997,580 feet of red and white pine, 3,935,443 feet of oak timber, 34,573,853 feet of pine plank and 9,213,827 feet of pine boards. As a result of this condition, by an imperial act duties were imposed upon lumber brought in from the United States as follows:

	£	s	d	per M
Shingles under 12 inches.....	..	7	"	"
Shingles over 12 inches.....	..	14	"	"
Red oak staves.....	1	1	"	"
White oak staves or headings.....	..	15	"	"
White or yellow pine (1 inch).....	1	1	per M feet	
Pitch pine lumber.....	1	1	"	"
Other kinds of wood and lumber.....	1	8	"	"
Wood hoops.....	..	5	3 per M.	

This growth in the use of the colonial product was made in the face of a very strong prejudice in favor of the Baltic product. The select

committee of the House of Lords which heard evidence on the subject in 1820 was furnished with evidence on the part of timber experts as to the inferiority of timber from British America which today not only excites wonder and ridicule, but which demonstrates what an important bearing sentiment has upon trade. One timber merchant and builder examined by the committee said the timber of the Baltic in general was of quality very superior to that imported from America, which latter was inferior in quality, softer, not so durable, and very liable to dry rot. Its use was not allowed by any professional man under the Government, nor in the best buildings in London. Speculators alone used it and that because the price was lower. Two planks of American timber laid upon one another would show evidence of dry rot in twelve months, while Christiania deals in like situation for ten years would not show the like appearance. There was something in American timber, he thought, which favored dry rot unless there was air on all sides.

In spite of this prejudice² the lower duty caused colonial timber to be extensively used and once given a fair trial the prejudice gradually disappeared. Fifteen years after the investigation just recorded another was held by a House of Commons committee, in 1835, which showed the change in opinion. One of the witnesses here gave as a reason for the former prejudice against colonial timber that while low grades were brought in by "seeking" ships, the high duty on Baltic timber kept all but the best grades of that timber out, so that the British builder was acquainted with the better grades only. A Liverpool ship owner and timber merchant said that, if duties were equal, he could get from three pence to four pence a foot more for a particular description of colonial timber than he could for any Baltic. With this change of opinion there had gone another, by which red pine, formerly preferred to white, was dropped to second place, where it has ever since remained. A Manchester builder declared that white pine in bricks and mortar was less liable to decay than red pine or Baltic.

Canadian timber, which thus got a foothold through a preferential tariff, continued to hold its own in the years when the preference was gradually reduced and finally abolished altogether in the adoption of

² This prejudice still persists. As late as 1893 John Nisbet, in his work entitled "British Forest Trees and Their Sylvacultural Characteristics and Treatment," in speaking of Weymouth, or white pine (*Pinus strobus*), said: "In production of timber it is second in rate of growth only to the poplar, but its timber, known as American *white pine*, is neither so durable nor so remunerative that its production is likely to become as inviting as would undoubtedly be the case if it could command an easy and good market. As, according to Gayer, it is the lightest of all our acclimatised exotics, its cultivation may be recommendable wherever there is any fair demand for timber for packing cases or similar requirements."

free trade. Nevertheless, while the trade grew, there is no doubt that Canada felt the withdrawal of the preference not only upon lumber but upon all her products severely, and it was this, more than anything else, that caused the feeling of despondency and doubt which preceded confederation, a depression from which it required all the genius of Sir John Macdonald and the coöperation of his associates to arouse the people with the vision of a self-contained country stretching from the Atlantic to the Pacific.

In 1850 the timber exports from Canada (Quebec and Ontario) amounted to £971,375 and in 1857 the value had grown to £2,044,178. This had been accompanied by a growth in exports to the United States. In 1867, the year when confederation went into force, exports to Britain were \$6,889,783 and to the United States \$6,831,252.

CANADIAN LEGISLATION AND LATER HISTORY.

In the preceding pages has been recounted the effect of the laws of parliaments outside of Canada upon the timber trade. Now it will be advisable to consider the effect of the laws and regulations made in the country itself.

The first enactment of a Canadian legislature was passed in Lower Canada in 1805 to prevent accidents in navigating the rapids of the St. Lawrence, which, owing to the increasing shipments by that river to Montreal, had become frequent. The act provided for the appointment of an inspector and measurers of scows and rafts between Chateauguay and Montreal and for the regulation of pilots. These officials, who were to reside in the parish of Chateauguay, were from time to time to take the depth of water of the rapids and determine what water scows and rafts might draw in order to pass the rapids in safety. They were, upon application, to measure the draft of each scow and raft and to cause the former to be lightened to the draft determined as the limit of safety. Pilots were to be licensed yearly by the justices of the peace for Montreal, upon recommendation of the inspector, for which license a fee of two shillings and sixpence was charged. The pilots' fees for taking rafts and scows through the rapids were: Scows, 30 shillings; rafts consisting of two cribs, 12 shillings and 6 pence. After October 1 to the end of navigation these were increased by one-fifth.

Fines up to forty shillings were imposed upon measurers or pilots neglecting their duty and upon unlicensed persons acting as pilots. A pilot who, without the consent of the owner, left a raft or scow stranded in the rapids was fined the loss of his fees and 20 shillings. The pilot

was allowed 5 shillings a day while he remained with the wreck and assisted in saving the property and in clearing the rapids of the obstruction. The fees for measurements were: Scows, 6 shillings; crib and rafts 2 shillings and 6 pence, and rafts of firewood 1 shilling 6 pence. These fees, by an act of 1808, were applied to the improvement of the rapids.

In the same year an even more important measure affecting the industry was passed. This provided that no lumber should be exported until it had been culled, measured and certified as to quality. The governor was authorized to appoint master cullers at Quebec and Montreal who were to ascertain the quality and dimensions of the articles submitted to them and to give a true and faithful account of those found merchantable, which was to be final and conclusive between buyer and seller. The act laid down the standards for square oak and pine, planks, board, etc. It was reenacted in 1811 and 1819 and made more stringent in its provisions. At the same time in all these acts there were most contradictory clauses. In some the shipment of unstamped timber (as having passed the culler) was prohibited, while in others it was stated that second or inferior grade lumber might be exported. The cullers were apparently governed by the contract between the buyer and seller, and the rigid definitions of what constituted merchantable timber were only to apply where no specific agreement between the parties existed. After being put beyond question upon a voluntary basis in 1829, it was finally allowed to expire by lapse of time, in 1834.

There was no further legislation on this point until after Quebec and Ontario were united in 1841 (Ontario having been created a separate province, called Upper Canada, in 1791). In 1842 an act was passed, further amended by an act of 1845, which got over the previous difficulties by creating three grades for timber and deals.

As in Ontario, the Crown first began to collect timber dues in 1826, and the regulations in this respect followed those of Ontario until the union of the two Provinces. As a rule, however, Ontario, by reason of greater facility in getting lumber to market, has charged dues a little higher than her sister province. As in Ontario, from the first the Crown adopted the plan of not selling timber lands but of granting a license to cut timber upon Crown lands within a certain specified time, at the end of which the land returned to the Crown either to be granted to the settler for agricultural purposes or to be held until the timber grew again. The way in which these wise provisions were evaded for many years was this:

Since the timber cost money and the land was free or sold at a very low price on easy terms to the settler, men who never intended to farm the land, or to settle farmers upon it, got areas large or small granted to them and, having stripped them of their timber, allowed them to go back into the hands of the Government. Where they had made a small first payment they either let that go as a fine or endeavored to sell out to a bona fide settler.

Quebec, or Lower Canada, passed through the same period of wasteful granting away of Crown lands as did Upper Canada, and this period culminated in a like rebellion in 1837 and the granting of responsible government, when the two Provinces were united in 1841. The two Provinces then for over a quarter of a century, until 1867, enjoyed laws common in nearly every respect. The timber question was one of the first taken up and the regulations made at the first session of the united parliament laid the foundation of all subsequent progress in forestry.

The orders in council of 1842 limited the period for which the license was granted, and introduced the plan of putting the berths up at auction where there was more than one applicant. The rule had been that the applicant simply paid the dues; and there had been much Crown land covered with timber in regard to which lumbermen did not clash or compete. Now, however, the easily reached limits began to grow scarcer and the applicant who offered the highest "bonus" or lump sum for the limit, in addition to the dues, was awarded it. In all these cases the timber only was sold, the land being reserved on the general principle that it would be taken up by the settler after the timber was taken off. The ignoring of the fact that much of the land was not fit for settlement was the chief fault in these regulations, because the idea of the time limit seems to have been handled chiefly in such a way as to insure that the operator would at once proceed to work his limit. The consequence has been that where the land is not fit for settlement some firms that got their licenses in the early days have continued holding and cutting over limits for many years, whereas, had the lease terminated absolutely on a certain date, the berths would have gone back into the hands of the Government, which, after allowing them to rest for a few years, might have resold them for a greatly increased bonus. As it is the Government secures only the ground rent of about \$3 a mile per annum and the dues on the timber cut. Later regulations have been more definite and the worked limits are now year by year falling back into the possession of the Crown.

Further regulations made in 1846 restricted the size of the limits to five miles frontage along the stream and five miles inland, or half way to the next river. The licensee bound himself to cut 1,000 feet a mile yearly on his limit.

The season of 1845 was a prosperous one in the trade, and 27,702,000 feet were brought to Quebec and 24,223,000 feet exported. This good trade caused an over-production in the next year, and as the British trade fell off there was a serious depression. This was accentuated by the provision that the operators must cut 1,000 feet a mile each season on their limits regardless of the conditions of the trade.

The inevitable parliamentary committee of inquiry appeared in 1848, before which W. W. Dawson, a leading Bytown (Ottawa City) lumberman, stated that in 1847, including the quantity in stock and that brought to market, there was a total supply of 44,927,000 feet to meet a demand for 19,060,000 feet. The next year the supply was 39,447,000 feet and the demand 17,402,000 feet. He attributed the decreased demand to the commercial depression in Europe and the unprecedentedly large supply thrown upon the European market from the Province of New Brunswick. As to the over-supply he gave three reasons: The regulations requiring the manufacturing of a large quantity per mile; the threatened subdivision of limits, and the difficulties regarding boundaries.

The threatened reduction or subdivision of limits in three years to the size of five by five miles caused operators to endeavor to clear off their big limits before being compelled to hand them back to the Government. The lumbermen accused the Government of inaction in regard to their boundaries, and in consequence, in order to defend their limits, they had resort to physical force. This meant that the operator trebled or quadrupled his men to be superior in numbers to his opponent, and, as the men were on the ground, this meant the trebling or quadrupling of the output.

The chief remedy suggested by the lumbermen to the committee was that, instead of endeavoring to prevent the holding of limits for speculation by compelling the cutting of a certain amount of timber a year, an annual ground rent of two shillings six pence a square mile should be levied, which should be doubled in case of nonoccupation, and the doubling continued every year the limit remained unoccupied. They also suggested that the dues be collected upon actual measurement instead of upon a count of sticks. For instance, red pine was

figured on an arbitrary average of thirty-eight feet a stick, whereas the sticks ran from twenty-six to sixty feet, and a spar or mast worth £10 paid only the same duty as a small stick available for building.

The committee reported recommending such action, and as a result the first Crown timber act was passed in 1849. This cleared up many points in dispute. Under the regulations accompanying the act the size of berths permitted was doubled; that is, ten miles along the river by five miles deep, or fifty square miles, but only half that size was permitted in surveyed townships. The dues imposed were: White pine, square timber, $\frac{1}{2}$ d a foot; red pine, square timber, 1d; basswood and cedar, $\frac{1}{2}$ d; oak, $1\frac{1}{2}$ d; elm, birch and ash, 1d; cordwood, hard, 8d a cord; soft, 4d; red pine logs, twelve feet long, 7d a log; white pine logs twelve feet long, 5d; spruce, $2\frac{1}{2}$ d. Each stick was to be computed as containing cubic feet as follows: White pine, 70 cubic feet; red pine, 38; oak, elm, ash, birch, cedar and basswood, 34. Statements under oath were to be made of the kinds and quantities of timber cut. The ground rent plan was not adopted, but the minimum quantity to be cut on each mile was reduced to 500 feet a year.

There was one clause which gave rise to a great deal of trouble in after years. This provided that squatters were liable to the penalties for cutting timber without license, but the dues on timber cut on land purchased but not all paid for were to be collected by the Government as part payment for the land. The arbitrary regulation as to the quantity in each stick was made elastic by providing that the operator could have the timber counted or measured as he chose. The regulations also gave the limit holder a preferential claim above all others to a renewal of his license, and thus gave greater permanence to the lumbering business.

In the regulations of 1851 a ground rent of two shillings six pence a mile was introduced, which rent doubled and increased annually in that proportion, when the limit was not worked. It was provided also that, where expenses of surveys made it advisable, licenses might be disposed of at an upset price fixed by the Commissioner of Crown Lands; and, in case of competition, awarded to the highest bidder. Owing to the representations of mill owners and municipalities in western Ontario, chiefly about London, the dues were doubled when the logs were destined for export. This was to protect manufacturers against the practice by American citizens of procuring lands at a low rate for the purpose of cutting timber to be manufactured in the United States.

The good effect of these new regulations was at once seen. The revenue had been £22,270 in 1848; £24,198 in 1849; £24,728 in 1850 and £30,318 in 1851. In 1852, the first year the new regulations went into force, the receipts rose to £53,013, of which £7,656 was for ground rent, and this in spite of the fact that dues on red pine had been cut in two. Up to this time red pine bore a penny a foot, while white pine bore only a half-penny; but, owing to the decline in the British preference for red pine, it had gone down in price and white pine had gone up. This seems to have been a case where prejudice backed by higher import duty gave red pine a fictitious value for years. A memorial of manufacturers showed that the price of red pine decreased from one shilling in 1844 to eight pence in 1851. The duty was accordingly reduced to one-half pence a foot. The ups and downs of the trade are shown in the returns of timber measured by the supervisor of cullers at Quebec during 1845-52:

Year.	White pine (feet).	Red pine (feet).
1845.....	19,141,982	4,444,515
1846.....	24,682,815	5,183,807
1847.....	12,074,708	6,516,922
1848.....	7,132,127	4,223,952
1849.....	11,924,198	3,797,584
1850.....	14,388,593	2,121,316
1851.....	15,487,180	3,189,657
1852.....	26,364,464	1,857,333

From 1841 to 1867 Quebec and Ontario constituted one province, and the regulations, with some exceptions to meet local needs, were the same in both sections. These are set out at considerable length in the chapters on Ontario and need not be repeated here. In general it may be said that the plan of selling the rights to cut timber under license, allowing the land to remain in the possession of the Crown was developed, the bonuses paid at the auctions held growing larger and the dues and ground rent heavier as the timber increased in value.

The original export trade of Canada in timber looked wholly to Europe as its market, and of this trade Quebec City was the center. This trade appears to have reached its zenith about 1864 when 1,350 square rigged ships entered the St. Lawrence to load lumber, and when 20,032,520 cubic feet of white pine timber was shipped. The wastefulness of the square timber trade, the decline of wooden ship building and the rise of the new export trade with the United States all operated against Quebec's preëminence, and the trade declined, much of it going to Montreal. Of late years, however, new railways, the bringing in of spruce as a valuable wood, and above all the ambition and energy of the citizens of the old capital of Canada, have set it on the up grade

again. Since 1867, when Quebec became a province in the Dominion and separated from Ontario, the provincial revenue derived from the forests has steadily increased, with slight fluctuations showing the effects of world-wide depression or prosperity.

The following table, by fiscal years ending June 30 of each year named, shows the amounts collected from Crown lands, as timber dues, ground rent, timber limits sales, etc. :

Year.	Interest, trespass penalties and fire tax.	Ground rent.	Timber limits sales.	Transfer fees.	Timber dues.	Total.
1868.....	\$ 3,404.66	\$ 22,401.03	\$ 3,928.50	.....	\$165,381.77	\$ 195,115.96
1869.....	2,823.27	55,055.06	74,894.97	.....	198,977.82	331,751.12
1870.....	7,208.37	64,089.20	22,518.37	\$ 1,584.00	267,468.08	362,868.02
1871.....	3,122.68	63,297.43	62,437.34	4,790.00	272,833.12	406,480.57
1872.....	4,102.44	86,783.01	56,191.81	4,886.00	292,989.42	444,752.68
1873.....	3,186.67	90,950.84	68,941.18	9,242.66	346,361.27	518,682.62
1874.....	32,906.06	97,220.37	31,385.93	5,384.00	361,080.51	527,976.87
1875.....	15,380.21	90,565.04	3,259.50	15,361.00	408,169.12	532,734.87
1876.....	11,025.65	96,881.82	572.00	3,764.07	274,530.64	386,774.18
1877.....	10,686.72	94,588.07	.....	16,658.82	269,685.24	391,618.85
1878.....	10,915.20	85,385.12	.....	6,410.00	248,612.84	351,323.16
1879.....	8,684.01	87,558.04	448.00	526.00	217,664.04	314,890.09
1880.....	12,065.94	96,157.86	.....	3,219.75	231,437.89	342,881.44
1881.....	7,611.48	94,633.90	132,774.25	4,548.88	303,950.25	543,518.76
1882.....	12,069.09	111,113.78	26,921.25	4,239.70	514,252.57	668,596.39
1883.....	17,006.21	94,424.68	2,055.00	3,441.48	567,815.97	684,743.34
1884.....	13,363.26	83,399.92	246.27	910.75	562,836.93	660,757.13
1885.....	9,449.77	99,884.86	68,145.61	2,565.25	360,070.28	530,115.77
1886.....	13,047.63	100,548.76	112.00	3,646.09	411,220.32	528,574.80
1887.....	12,427.56	90,684.83	470.00	3,418.28	475,617.40	582,618.07
1888.....	7,597.91	141,549.88	.....	2,315.03	447,200.87	598,663.69
1889.....	7,293.81	124,314.09	118,253.65	1,719.25	707,357.20	958,938.00
1890.....	12,380.96	147,208.72	17,646.04	2,062.31	626,753.66	806,051.69
1891.....	11,185.81	125,141.77	9,023.12	2,516.25	498,370.30	646,237.25
1892.....	12,641.42	132,984.95	.....	3,470.53	474,900.79	623,997.69
1893.....	19,293.97	152,664.67	68,822.10	4,989.04	642,952.63	888,722.41
1894.....	11,171.82	147,660.59	18,549.70	2,008.12	644,516.89	823,906.92
1895.....	15,713.15	147,203.51	9,388.05	2,378.25	597,672.60	772,355.56
1896.....	14,858.21	143,485.73	83,255.20	4,239.47	705,260.31	951,098.92
1897.....	11,317.41	155,572.54	4,025.75	3,522.50	607,863.33	782,303.53
1898.....	15,045.53	148,935.18	30,110.48	3,561.25	713,435.36	911,088.30
1899.....	21,708.96	166,338.50	129,023.34	7,508.50	569,710.18	894,289.48
1900.....	13,947.61	170,508.71	339,748.06	2,819.25	585,505.89	1,112,529.52
1901.....	14,958.50	178,250.71	403,197.72	4,435.00	638,230.12	1,234,072.05
1902.....	8,406.94	163,983.00	201,483.39	11,871.74	669,292.41	1,055,037.48
1903.....	14,895.70	187,206.25	352,004.58	20,076.00	667,631.96	1,241,814.49
1904.....	16,988.03	176,226.41	252,554.01	6,575.06	715,134.02	1,167,477.53

As to the quantities of timber cut in Quebec, this is not easy to ascertain, since different methods have been adopted at different times and the products of private lands are not included, except in the decennial census. This is particularly the case with pulpwood, which has become an article of great importance in the last few years. The following tables are of timber cut on Crown lands:

SAWLOGS.

Year.	Red and white pine (feet b. m.).	Spruce and hard- wood (feet b. m.).
1867.....	151,837,800	29,389,800
1870.....	221,854,400	29,301,800
1880.....	246,930,800	95,764,400
1890.....	304,508,200	188,517,400
1895.....	207,195,800	270,156,800
1901.....	107,206,880	319,866,256

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SQUARE TIMBER.

Year.	Red and white pine (cubic feet).	Birch, elm and hardwood (cubic feet).
1867.....	4,892,699	71,916
1870.....	3,983,458	33,199
1880.....	1,596,243	144,617
1890.....	3,145,697	2,955,799
1895.....	1,443,942	40,785
1901.....	635,621	129,004
Year.	Small tamarack, spruce and pine (lineal feet).	Knees, shingles, ties, pickets, etc. (pieces).
1867.....		6,308,000
1870.....		9,713,000
1880.....	582,949	206,202,000
1890.....	422,041	216,859,000
1895.....	620,209	340,431,000

A review of the area of Crown lands in Quebec under license to cut timber and the quantity of sawlogs produced from such lands is interesting as showing the changes in areas so held, the gradual decline in the pine trade, due to the diminishing supply of pine timber, and the rapid growth in recent years of the spruce industry. Such a table, covering the twenty-five years ended with 1903, has been compiled³ from the reports of the Commissioner of Crown Lands. It is as follows:

PRODUCTION OF PINE AND SPRUCE SAWLOGS FROM CROWN LANDS OF QUEBEC.

Year.	Area under license (square miles).	White pine sawlogs (pieces).	Spruce sawlogs (pieces).	Small pine sawlogs (pieces).
1879.....	42,631	1,032,880	797,440	.....
1880.....	47,185	1,179,045	655,837	.....
1881.....	46,278	1,791,873	1,208,184	.....
1882.....	48,494	2,418,958	1,308,315	.....
1883.....	43,489	2,611,986	1,418,635	.....
1884.....	41,260	2,642,058	1,311,382	.....
1885.....	45,249	1,703,874	723,679	.....
1886.....	46,078	2,187,098	1,038,937	.....
1887.....	42,440	2,386,614	1,344,477	.....
1888.....	41,584	2,295,012	959,703	.....
1889.....	41,569	2,959,675	1,407,141	.....
1890.....	44,201	2,802,073	1,324,872	.....
1891.....	45,190	2,137,038	2,613,907	.....
1892.....	42,965	2,297,814	2,522,781	.....
1893.....	46,006	3,212,056	2,740,496	152,469
1894.....	44,384	2,441,434	2,759,594	648,654
1895.....	46,397	2,063,951	3,281,590	961,688
1896.....	42,728	1,535,978	3,317,945	1,496,874
1897.....	46,155	2,151,949	4,594,830	1,650,827
1898.....	46,863	2,008,866	5,992,214	1,048,327
1899.....	45,889	1,483,041	5,431,789	883,576
1900.....	51,194	1,768,231	5,505,070	989,314
1901.....	48,818	1,679,793	6,136,799	1,520,497
1902.....	62,952	2,479,197	7,186,041	406,488
1903.....	62,730	1,786,263	5,658,143	1,307,942
.....	.....	53,259,157	72,439,841	11,066,656

³ The *Canada Lumberman*, January, 1905, page 61.

It is only within the last few years that pulpwood has become of consequence, but in 1903 the Government reported a total of 259,231 cords cut on Crown lands. There were also in that year 94,079 lineal feet of poles, 780,960 railway ties, 9,174 pickets, 2,424,500 shingles, 426 rails, $23\frac{1}{2}$ cords of hemlock bark and 11,710 cords of white birch spool wood.

The most important point at the present time is the outlook for the future. It may be said that, whereas ten years ago very pessimistic views were entertained as to the quantity of timber left standing in Quebec, today the views are much more hopeful. There are two reasons for this: First, the development of the use of other woods, particularly of spruce; and, second, the realization that if fire is kept out and the fake settlers stopped, the forests will reproduce themselves much more rapidly than formerly supposed. Besides, people are realizing that much of Quebec is unsuited for agriculture, whereas these districts are eminently suited for the perpetual growth of timber. The Government and the lumbermen are coöperating in the preservation of the forests by a system of fire ranging and by leaving the young timber to attain its full growth. Senator Edwards, of Ottawa and Rockland, one of the largest limit holders in Quebec, in speaking recently on this subject said that his candid opinion was that Quebec possesses today the best asset in America. Ontario has timber larger and of better quality, but Quebec has the young and growing timber. The pine in sight, Mr. Edwards was inclined to think, might last, with care, fifty years, but if fires (which have destroyed ten times as much as the ax) are kept out and settlement prohibited on the small areas of good land occurring in the forest regions, the trade might be continued indefinitely.

As Quebec is the largest eastern province and also the greatest forested province in the Dominion, with a land area of 341,756 square miles, and reaches back into the unexplored north, it is likely that it will continue to be the great source of timber production in Canada.

During the spring of 1904 a commission reported to the Quebec government against indiscriminate settlement, with the result that the Government and the lumbermen are nearer together and working more in harmony than ever before. The commission favored an increase in the numbers and joint control of the fire rangers; and, seeing that a million dollars a year of the provincial revenue comes out of forests, the legislators can be relied upon to be anxious to preserve the goose which lays this golden egg.

Both Quebec and Ontario have been fortunate in the supply of right kind of labor for this trade. The cheerful, fun-loving, hardy French-Canadian takes to lumbering like a duck to water. His skill in handling the ax, in driving, in walking on floating logs and in jam-breaking, have a world wide celebrity; while the songs with which he lightens his labors with the oar or on snowshoes are a national inheritance and pride. Curiously enough from the other side of the great river, from the Ontario shore, have gone with him the men of a supposedly antithetical race, the canny, dour Scots of Glengarry County, men who knew no language but Gallic and no law but the strong hand. Although they have fought for their masters over disputed lines and fought for themselves out of sheer prowess so as to make "The Man from Glengarry" one of the most picturesque of modern novels, yet these deeds of daring have served only to unite the two sides of the Ottawa in firmer bonds of respect and admiration.

CHAPTER IX.

QUEBEC—PRESENT CONDITIONS.

According to an estimate published in 1895 by the Dominion statistician, there were then in Quebec 116,521¹ square miles of forest and woodland. This, however, included a considerable area unfit for lumbering and covered with a small growth of little merchantable value. That portion of the Province extending north of the Ottawa River to the Height of Land, and the districts watered by the Saguenay, the St. Maurice and their tributaries were originally covered with forests of great value, with pine their most important component, though now much depleted by fire and by lumbering operations—especially in the Saguenay and Lake St. John districts. North and east of this region there are considerable areas of spruce suitable for pulpwood. South of the St. Lawrence from the Gaspé Peninsula to the boundary only small and scattered pine forests remain. Spruce is the dominant tree, but owing to the demand for pulpwood the supply is rapidly diminishing. Much hemlock is cut for tan bark, and maple, birch, cedar and tamarack are largely cut throughout the Province.

Much of the present area of Quebec is still largely unexplored. The territory embraced within the provincial lines prior to 1895 has been largely surveyed but the additions made as a result of the legislation which then took place included territory that previously had been designated as a part of Labrador. The present northern boundary of the Province, beginning at the west, follows the East Main River, which empties into the James Bay, a branch of Hudson Bay, nearly one hundred miles north of its southern extremity. From the headwaters of the East Main River at Lake Patamish, just south of the fifty-third degree of north latitude, it runs due east until it strikes the Hamilton River, which at that point runs almost due north. The Hamilton River is followed thence throughout its entire course and through Rigolet Bay to about the head of Hamilton Inlet, on the Atlantic, from which the boundary sweeps in a long curve a little east of

¹The total area of the Province of Quebec, according to the "Statistical Year Book of Canada," is now 351,873 square miles, of which 341,756 square miles are land. The above estimate of wooded area does not agree with that given on page 61—225,552 square miles—the latter and later estimate applying to the increased area of the Province since 1896, though the remarks as to quality apply with even more force to the larger area.

south to the Strait of Belle Isle, striking it a short distance west of the fifty-seventh degree of west longitude. Exploration of the country north of the Height of Land and of the eastern part, except along the shore of the Gulf of St. Lawrence, has been confined to the principal rivers and lakes, many of which have not yet been defined as to their entire length or exact boundaries.

An enormous field for lumbering operations has been opened up of late years in the region made accessible to shipping ports by the Quebec & Lake St. John railway. In 1904 between twenty-five and thirty saw-mills were in operation in this territory. Of a total of 19,200,000 acres in the Lake St. John district less than 500,000 are under cultivation or cleared, and the remainder is all wooded. Of the timber about seventy-five percent is spruce, and the remainder is made up of balsam, fir, white birch, cypress and a little pine. Fire has ravaged the forests in some places, but the effects of fires of thirty years ago are hardly visible, as there is a fine second growth.

The pulpwood supply in this district is very extensive. An official estimate places the first cut of pulpwood at one hundred million cords, which would give over sixty-five million tons of pulp. The water power of the principal outlet of the lake and of several large rivers by which it is fed is calculated at over 650,000-horse power. Pulp mills have been established at Chicoutimi and Jonquies on the Saguenay, at Shawenegan on the St. Maurice and at other points.

TIMBER LICENSES AND DUES.

The timber lands of Quebec are leased by the Provincial government to operators, the right to cut being disposed of by public auction, subject to the payment of dues on the cut in addition to a yearly ground rent. By far the larger portion of the lands under license to cut timber in the Province of Quebec is found between the Quebec & Lake St. John railway on the east and the Ottawa and the provincial boundary on the west, and between the Ottawa and St. Lawrence rivers on the south and the forty-eighth degree of north latitude on the north. With the exception of a strip of country north of the St. Lawrence and Ottawa rivers from the City of Quebec to just above the City of Ottawa and some unlicensed territory in the north, this immense tract of country, 350 miles long by an average of 125 miles wide, is all under license. South and north of Lake St. John and the Saguenay River are also large bodies of land under license, and smaller and scattering tracts are found all along the north shore of the St. Lawrence to its mouth

opposite the west end of the Island of Anticosti. The land under timber license extends almost unbroken all along the provincial boundary from New Hampshire to the Gulf of St. Lawrence, but the St. Lawrence River shore is open, as is the country surrounding Quebec and Montreal.

In 1903 there were 64,979 square miles under license, the receipts from which form a considerable portion of the revenue of the Province. During the year ended June 30, 1904, \$252,554 was realized from sales of limits, \$715,134 from dues, \$176,226 from ground rents and \$23,563 from fire tax, transfer fees and other sources, making a total of \$1,167,477.

The dues payable on timber are as follows: Square and waney timber, per cubic foot, oak and walnut 4 cents, all others 2 cents; sawlogs, boom and dimension timber, per 1,000 feet b. m., white pine \$1.30, red pine 80 cents, spruce, hemlock, balsam, cypress, cedar, white birch and poplar 65 cents; pulpwood, 65 cents a cord, with a rebate of 25 cents if manufactured in Canada.

The following is the cut upon which government dues were paid during the year ended June 30, 1903: Square timber, hardwood, 150,-919 cubic feet; square pine, 950,451 cubic feet; spruce, hemlock, etc., sawlogs and boom timber, 377,219,740 feet b. m.; white pine sawlogs and boom timber, 175,072,927 feet b. m.; red pine sawlogs and boom timber, 33,101,822 feet b. m.; white pine sawlogs eleven inches and under, 69,286,889 feet b. m.; poles, 94,079 lineal feet; pulpwood, 259,231 cords; fire-wood, 1,612½ cords; railway ties, 780,960; pickets, 9,174; shingles, 2,424,500; rails, 426; hemlock bark, 23½ cords; lath wood, 31 cords; white birch for spool wood, 11,710 cords, and posts, 1,255.

THE EXPORT TRADE.

As has been indicated, the City of Quebec was, until comparatively recent years, the center of the timber and lumber export trade, but Montreal now holds that position. This change has been largely coincident with the growth of the trade in sawn lumber and the decline in square timber shipments. The first timber shipped from Canada to Europe was exported under the French regime in 1667. The export to England began in the early days of the Nineteenth Century when the continental ports were closed against British trade by Napoleon. The trade grew rapidly, and when at its height as many as 1,350 square-rigged ships entered the port of Quebec yearly to load timber. It reached its climax about 1864, in which year 20,032,520 cubic feet of

square timber were exported, and since then it has gradually declined. Formerly, shipments of pine deals were extensively made from Quebec. In 1880 5,823,263 standards were shipped, but the bulk of this trade has now gone to Montreal.

The palmy days of Quebec City as a timber port were also characterized by much activity in shipbuilding, forty or fifty ships sometimes being built in a year. At one time the timber trade at this port gave employment to 5,000 or 6,000 laborers. The timber coves there extended for a distance of ten miles on both sides of the river. Now hardly a mile on the Quebec side is so occupied, with but two or three coves across the river.

The lumber export trade of Montreal dates back about forty years. It was commenced by Dobell, Beckett & Co. and has increased from year to year until Montreal has become the transshipping port for all the pine product of the Ottawa Valley that is sent over seas. During the season of navigation the deals are conveyed in barges, carrying an average of one hundred and forty-five standards each, down the Ottawa River and the Lachine Canal and transferred directly to the steamer. The forest product, at one time shipped in the form of square timber, is now manufactured into deals and boards, and Montreal has become the leading port of export, as the tendency of modern shipping operations is for vessels to load at the head of navigation. Montreal is practically a free port for shipping, and it is frequently the case that freights are obtainable there on lower terms than in Quebec. In 1879 the lumber shipments from Montreal amounted to 10,499,951 feet; in 1877, to 32,920,390 feet; in 1888, to 117,329,721 feet; in 1895, to 175,372,976 feet; in 1898, to 335,429,190 feet; in 1900, to 239,686,145 feet, and in 1904, to 153,989,912 feet.

The decrease shown of late years in these figures is due not to decline in the export business, but to the route which it takes. Montreal is a summer port only, as all the St. Lawrence ports are handicapped by ice during the winter and early summer so that insurance rates are usually higher from the St. Lawrence than from ports on the open Atlantic. This has led to a considerable shipment of lumber and other forest products in bond to Portland, Boston and New York, Portland being especially favored because it is a terminus of the Grand Trunk railway; while open Canadian ports, like Halifax, take some of the business which otherwise would go by vessel from the St. Lawrence. Much progress, however, has been made in the improvement of

navigation on the St. Lawrence up to Montreal, the channel admitting vessels drawing thirty feet of water, and while the ice will always form a hindrance to winter business, the liberal policy of the Canadian government and the great improvements that have been made on the St. Lawrence are fast increasing the popularity of that route, so that it is not improbable that shipments of forest products from Montreal, and perhaps from Quebec, will in the future be larger than in the recent past.

The St. Lawrence is a tidal river as far as Three Rivers, about midway between Quebec and Montreal. In the original state of the river vessels drawing eleven to twelve feet of water could under careful pilotage reach the latter city. Dredging at bars and over shallow stretches so improved the channel that, as stated above, vessels drawing thirty feet of water can now dock at Montreal. Until a few years ago, however, navigation of the river was rather difficult, and was attempted by vessels of heavy draft only by day. A thorough system of buoys and channel lights has now made passage unimpeded during the season of navigation.

In 1868 the relative values of shipments of forest products were: Quebec, \$6,659,686; Montreal, \$631,289. In 1903, the value of forest products shipped from Quebec was \$4,022,346, and of those from Montreal, \$5,121,472. The trade of the former port has revived somewhat of late years under the stimulus of railway connection with the Lake St. John district, and other enterprises, but it is hardly likely to regain its supremacy.

The shipments of forest products from Montreal for the fiscal year 1903 included pine deals, \$3,147,150; spruce and other deals, \$684,070; planks and boards, \$650,008 and pulpwood, \$131,152. Those from Quebec City in the same year comprised pine deals, \$122,960; spruce and other deals, \$1,270,325; planks and boards, \$68,539; pine (white, square) \$1,297,427; oak (square), \$411,313; red pine, \$212,634, and elm, \$296,496.

SHIPPING INTERESTS.

It is of interest to note the decrease in the number of sailing vessels clearing at Quebec, as the traffic is now almost entirely carried on by steamer. The following table shows the lumber laden sailing vessels cleared at the port of Quebec for sea between the opening and close of navigation in the years 1874 to 1904, inclusive, with their tonnage:

SAILING VESSELS CLEARED FROM THE PORT OF QUEBEC.

Year.	Vessels.	Tons.
1874.....	854	636,672
1875.....	642	478,441
1876.....	786	624,110
1877.....	708	670,627
1878.....	476	399,833
1879.....	433	364,828
1880.....	634	555,451
1881.....	459	390,186
1882.....	428	359,925
1883.....	487	416,169
1884.....	366	291,398
1885.....	369	294,789
1886.....	325	250,635
1887.....	271	206,172
1888.....	227	195,928
1889.....	275	240,592
1890.....	250	238,162
1891.....	205	182,615
1892.....	244	225,008
1893.....	177	146,970
1894.....	136	115,639
1895.....	88	70,960
1896.....	108	82,622
1897.....	147	90,381
1898.....	121	70,586
1899.....	80	50,242
1900.....	89	45,036
1901.....	68	37,171
1902.....	88	33,534
1903.....	53	25,141
1904.....	46	19,126

The extent to which steam tonnage has replaced sail, is shown by the fact that in 1902 the number of steamers entering the port of Quebec for part or entire cargoes was 186 of an aggregate of 507,097 tons; in 1903, 185 of 538,672 tons, and in 1904, 165 of 506,702 tons.

The premier position of Montreal as a St. Lawrence port, due to its being the head of navigation for ocean-going vessels, is shown by the following table which gives the number and tonnage of sea-going vessels entered at that port for the years named :

Year.	Ships.	Tonnage.
1901.....	707	1,438,081
1902.....	728	1,530,023
1903.....	797	1,991,272
1904.....	796	1,856,697

Quebec is to be reached by sailing vessels, while Montreal is, for all practical purposes, available only to steam—and this is the age of steam navigation.

EXPORTS AND STOCKS.

The most recent available figures concerning exports from Quebec are those for the year 1904, and these show a decrease in exports from River St. Lawrence points to Great Britain in comparison with the year 1903. The total exportations amounted to 302,932,776 feet, a decrease of 142,408,833 feet from the figures of 445,341,609 feet recorded in 1903. Quebec is a heavy manufacturer of spruce clapboards, and

there was a decided reduction of export of this material, due to the stagnant condition of the spruce market.

The principal article of shipment from Montreal is pine in the form of deals and boards, while other St. Lawrence ports ship principally spruce deals and square and waney timber. Exports for trans-Atlantic markets during 1903 and 1904, by ports and shippers, were as follows:

FROM MONTREAL.		
Shippers.	1903 Feet b. m.	1904 Feet b. m.
Watson & Todd.....	51,801,868	38,028,601
W. & J. Sharples.....	41,845,282	23,018,516
R. Cox & Co.....	24,162,470	21,207,452
Dobell, Beckett & Co.....	35,594,800	18,387,510
J. Burstall & Co.....	22,105,969	13,040,437
McArthur Export Co., Ltd.....	15,412,412	8,929,166
Cox, Lang & Co.....	8,941,100	8,687,827
Charlemagne & Lac Ouaressau Lumber Co., Ltd.	10,289,247	5,067,412
McLaurin Bros.....	7,478,000	4,800,000
E. H. Lemay.....	1,815,000	1,918,000
Railways, small shippers, etc.....	11,442,596	11,098,991
Total.....	230,888,344	153,989,912
Decrease in 1904.....		76,898,432

Other St. Lawrence ports, including the City of Quebec, make the following showing for 1904:

FROM QUEBEC.	
Shippers.	Feet.
H. R. Goodday & Co.....	20,075,000
Dobell, Beckett & Co.....	13,872,800
W. & J. Sharples.....	11,708,600
McArthur Export Co., Ltd.....	7,370,664
Harold Kennedy.....	7,047,352
J. Burstall & Co.....	5,913,305
King Bros., Ltd.....	1,499,400
Total 1904.....	67,482,121
Total 1903.....	106,688,817

FROM THREE RIVERS AND PIERREVILLE.	
Shippers.	Feet.
Dobell, Beckett & Co.....	18,406,800
W. & J. Sharples.....	6,800,700
Total 1904.....	25,007,500
Total 1903.....	44,601,070

FROM OTHER PORTS.	
Shippers.	Feet.
Price Bros. & Co.....	46,653,833
Dobell, Beckett & Co.....	4,870,400
King Bros., Ltd.....	4,929,210
Total in 1904.....	56,453,443
Total in 1903.....	60,163,378
Total trans-Atlantic shipments 1903.....	445,341,609
Total trans-Atlantic shipments 1904.....	302,932,776
Decrease in 1904.....	142,408,833

While white pine and spruce make up the great body of the export of lumber from the Province of Quebec, other woods, including hardwoods, still figure in an important way in the trade of the Province. To show the volume of this business and the conditions surrounding it at the latest date available for this work, we give the following quota-

tions from an annual trade circular, issued by J. Bell Forsyth & Co., of Quebec, bearing date of January 9, 1905:

White Pine.—The stock of waney pine shows considerable increase in recent years, while that of square pine is the lightest on record. The continued advance in price of both waney and square pine has at last told on the export. As the manufacture this winter will not exceed half the past season's supply, and as makers seem unable to reduce their prices without actual loss, it seems evident present values must be maintained or manufacture cease.

	Supply.	Export.	Stock.
1904	{ Square 240,176 Waney 2,256,352 }	1,491,843	{ 347,067 Square 1,268,937 Waney }
1903	{ Square 419,600 Waney 1,865,560 }	2,181,961	{ 413,469 Square 406,088 Waney }

Red Pine.—The smallness of both supply and stock shows the approach of the end of business in this wood as square timber.

	Supply.	Export.	Stock.
1904.....	15,620	12,598	55,561
1903.....	57,360	84,292	53,225

Spruce Deals.—The export from Quebec and the lower St. Lawrence has been restricted by absence of demand and the inadequate prices obtainable. The cost of production has materially increased owing to advanced cost of labor, enhanced value of limits, and other causes. The demand in the United States for spruce boards being good at fair prices, the tendency is for Canadian mills to send their production very largely in that direction.

	Supply.	Export.	Stock.
1904.....	3,927,270	3,319,121	822,575
1903.....	4,919,710	5,060,053	157,213

Pine Deals.—The ruling prices in the United Kingdom, especially in the third and fourth qualities, have materially declined instead of meeting the ten percent advance paid by shippers for past season's production. Ottawa mill owners can readily obtain from United States markets figures at least equivalent to those paid for deals. It is clear that export business can not continue under present conditions.

	Supply.	Export.	Stock.
1904.....	110,358	97,310	15,518
1903.....	41,890	49,730	2,570

Sawn Lumber.—The demand from the United States has been good at fair prices, and in spruce the Canadian mills have cut boards for that market in preference to deals for export in many instances.

Oak.—The exports show a marked decrease, and the wintering stock a corresponding increase. The manufacture of this wood has entirely stopped, and will not be resumed until justified by demand, as western oak can not be profitably delivered at Quebec at present current prices.

	Supply.	Export.	Stock.
1904.....	328,360	201,767	665,670
1903.....	926,680	651,969	491,851

Elm.—The supply continues to diminish and price to advance, which will probably be the case year by year till the wood becomes too expensive for export or can not be obtained at all. The stock of rock elm is very small, the figures largely representing soft elm.

	Supply.	Export.	Stock.
1904.....	262,800	310,546	322,778
1903.....	417,800	477,217	419,659

Ask.—Will not be made this winter, as demand seems to have disappeared. The stock is ample for probable requirements.

	Supply.	Export.	Stock.
1904.....	14,840	26,192	25,145
1903.....	57,200	59,441	47,035

Birch.—The export of this wood continues to diminish from Quebec owing to reduced supply, the most accessible wood having been cut away, and the less accessible requiring prices that are not yet obtainable to induce manufacture.

	Supply.	Export.	Stock.
1904.....	125,920	127,882	1,027
1903.....	196,240	201,521	11

Through the courtesy of Messrs. Walcot, Limited, of London, we are able to present herewith a comparison of the square and waney supply (equivalent to production), exports and stocks of Quebec each year from 1850 to 1904, inclusive. There has been a marked change in the character of the forest exports sent by Quebec to the mother country. In the early years shipments of boards from Quebec to England were almost unknown, the entire export being in the shape of logs, which were sawed into planks and boards by English sawmills or part sawed to meet the needs of the purchasers. In 1861 a distinction became necessary, the history of the development being thus stated:¹

Previous to 1861 the timber shipped was square and of large average, beautifully hewn by the lumbermen in Canada; but board pine—that is, short logs of large girth—were sent down the drives with the other timber, and soon found their way into the market. Being cut from the lower part of the tree accounted for the waney character of the logs, but the quality of the timber was excellent. The loss in girthing them for conversion was considerable, but this was allowed for in the price to the importer. The decline in the quantity of square and waney pine made for the Quebec market is altogether due to the increase of the deal and board trade, and to some extent to the scarcity of suitable trees to manufacture into timber. A large proportion of the trees are still suitable to make into deal logs, but would not be sufficiently large to be made into waney board pine. This is exemplified by the smallness of the square pine that is now brought down from Ottawa. In former days square pine used to be made 70 and 80 and even 100 feet cube average; in the present day it is with difficulty that 40 feet average cube is procurable in square pine, and waney board pine is decreasing in girth annually. Formerly 20-inch and over average cube was easily

¹ In the *Timber Trades Journal*, of London, England.

procurable; today 17-inch is as large as most of the manufacturers will undertake, and they frequently fall below this average on delivery of the timber at Quebec. These changes are graphically portrayed in the following table:

PROVINCE OF QUEBEC—STATISTICS OF SQUARE AND WANNEY WHITE PINE
TIMBER. IN CUBIC FEET.

Year.	SUPPLY.			EXPORT.	STOCKS.		
	Square.	Wanney.	Total.	Square and wanney.	Square.	Wanney.	Total.
1850.....	14,398,000		14,398,000	13,040,000	5,046,000		5,046,000
1851.....	15,418,000		15,418,000	15,941,000	2,366,000		2,366,000
1852.....	27,631,000		27,631,000	15,691,000	12,711,000		12,711,000
1853.....	17,487,000		17,487,000	17,399,000	9,846,000		9,846,000
1854.....	19,648,000		19,648,000	19,612,000	7,587,000		7,587,000
1855.....	13,575,000		13,575,000	10,843,000	9,513,000		9,513,000
1856.....	18,000,000		18,000,000	13,993,000	11,776,000		11,776,000
1857.....	19,618,000		19,618,000	19,246,000	11,259,000		11,259,000
1858.....	14,328,000		14,328,000	13,388,000	11,290,000		11,290,000
1859.....	16,531,000		16,531,000	14,822,000	12,284,000		12,284,000
1860.....	18,564,000		18,564,000	18,253,000	11,390,000		11,390,000
1861.....	15,731,000	6,735,000	22,466,000	19,448,000	7,971,000	6,347,000	14,318,000
1862.....	21,628,000	748,000	22,376,000	15,493,000	15,355,000	3,950,000	19,305,000
1863.....	21,617,000	186,000	21,803,000	23,147,000	13,998,000	1,224,000	15,222,000
1864.....	23,737,000	735,000	24,472,000	20,032,000	17,600,000	331,000	17,931,000
1865.....	17,620,000	1,247,000	18,867,000	19,008,000	12,427,000	348,000	12,775,000
1866.....	14,386,000	2,245,000	16,631,000	15,541,000	10,875,000	763,000	11,638,000
1867.....	16,740,000	2,799,000	19,539,000	14,774,000	13,001,000	1,905,000	14,906,000
1868.....	10,029,000	2,158,000	12,187,000	15,279,000	7,648,000	1,715,000	9,363,000
1869.....	14,056,000	1,973,000	16,029,000	14,673,000	9,263,000	1,607,000	10,870,000
1870.....	12,616,000	1,504,000	14,120,000	14,142,000	8,877,000	620,000	9,497,000
1871.....	17,367,000	3,418,000	20,785,000	14,673,000	14,001,000	1,739,000	15,740,000
1872.....	11,151,000	4,450,000	15,601,000	15,515,000	11,065,000	3,618,000	14,683,000
1873.....	10,443,000	3,965,000	14,409,000	10,580,000	12,794,000	4,655,000	17,450,000
1874.....	7,364,000	1,829,000	9,193,000	13,514,000	8,211,000	4,053,000	12,264,000
1875.....	9,246,000	1,644,000	10,890,000	10,099,000	8,716,000	2,694,000	11,410,000
1876.....	15,994,000	3,249,000	19,243,000	13,883,000	12,167,000	2,502,000	14,669,000
1877.....	14,850,000	3,630,000	18,480,000	14,898,000	13,804,000	2,694,000	16,498,000
1878.....	7,917,000	1,847,000	9,764,000	8,194,000	15,114,000	3,190,000	18,294,000
1879.....	2,511,000	1,600,000	4,111,000	5,300,000	12,140,000	2,218,000	14,358,000
1880.....	4,244,000	2,236,000	6,480,000	11,553,000	6,197,000	797,000	6,994,000
1881.....	6,029,000	3,065,000	9,094,000	9,102,000	4,526,000	1,520,000	6,046,000
1882.....	8,053,000	3,127,000	11,180,000	7,912,000	6,532,000	3,355,000	9,887,000
1883.....	7,412,000	3,787,000	11,199,000	10,427,000	7,781,000	2,759,000	10,540,000
1884.....	3,707,000	2,200,000	5,907,000	6,048,000	7,502,000	2,399,000	9,901,000
1885.....	2,892,000	2,877,000	5,697,000	6,758,000	6,651,000	2,588,000	9,239,000
1886.....	3,033,000	3,077,000	6,110,000	4,526,000	6,573,000	3,267,000	9,840,000
1887.....	1,169,000	2,060,000	3,229,000	5,127,000	4,295,000	2,450,000	6,745,000
1888.....	1,791,000	2,029,000	3,820,000	6,020,000	2,580,000	1,227,000	3,807,000
1889.....	4,224,000	3,771,000	7,995,000	6,873,000	3,147,000	1,914,000	5,061,000
1890.....	5,083,000	3,695,000	8,778,000	5,496,000	4,800,000	3,528,000	8,328,000
1891.....	1,072,000	1,731,000	2,803,000	4,715,000	2,944,000	2,049,000	4,993,000
1892.....	2,380,000	2,740,000	5,120,000	5,800,000	2,835,000	1,618,000	4,453,000
1893.....	1,121,000	3,117,000	4,238,000	4,092,000	2,134,000	1,628,000	3,762,000
1894.....	838,000	2,289,000	3,127,000	2,469,000	1,657,000	1,611,000	3,268,000
1895.....	274,000	3,086,000	3,360,000	2,838,000	1,091,000	2,255,000	3,346,000
1896.....	516,000	2,871,000	3,387,000	4,252,000	537,000	1,474,000	2,011,000
1897.....	833,000	4,311,000	5,144,000	3,773,000	483,000	2,288,000	2,771,000
1898.....	1,062,000	1,993,000	2,965,000	3,015,000	1,354,000	2,452,000	3,806,000
1899.....	592,000	1,798,000	2,385,000	3,085,000	1,148,000	1,014,000	2,162,000
1900.....	571,000	1,595,000	2,076,000	2,755,000	806,000	556,000	1,361,000
1901.....	585,000	1,447,000	2,032,000	2,317,000	590,000	861,000	1,451,000
1902.....	384,000	1,830,000	2,214,000	2,446,000	396,000	261,000	657,000
1903.....	420,000	1,865,000	2,285,000	2,182,000	413,000	405,000	818,000
1904.....	240,000	2,256,000	2,496,000	1,492,000	347,000	1,269,000	1,616,000

CHAPTER X.

QUEBEC—QUEBEC CULLING.

From an early period in the development of industry and commerce in Canada the timber trade has been an important element in the activities of the people. There was a demand in Great Britain and other European maritime countries for ship timber and timber for other structural purposes, which material was sent abroad in the squared form. There was also a call for spars or masts, bowsprits, booms and yards, and there was an extensive manufacture of boards, deals, planks, lath, staves, etc. Much of the cooperage stock went to the West Indies to supply the demand for sugar, tobacco and other packages. The forest products handled were white pine, red or norway pine, elm for ship timber, oak for the same purpose, squares of ash, basswood, butternut and birch. All of the woods mentioned were shipped to foreign ports in the form of square timber largely, much of it being resawed after it reached destination. There were also hickory handspikes, ash oars, "lathwood," as lath were called in the culling rules, and other forms. "Deals" were, as they are now, an important item in Canadian mill output. The word "deal" is synonymous with the word "cant," as applied to lumber—that is, a piece sawed to dimensions suitable for resawing. The standard Quebec or English deal was twelve feet long, eleven inches wide and two and one-half inches thick. A "standard hundred" of deals was one hundred of these pieces. Deals were a favorite form of lumber production, and much of the good white pine and norway pine of Canada was cut into deals.

The Quebec market in the early days, down to 1840 or 1850, was not only the gateway for the foreign distribution of forest products of all Canada, but also that market drew much from the Lake Champlain region of Vermont and New York, and all portions of the last named State which had access to the navigable waters of the St. Lawrence River and Lake Ontario. The rich pine of northern Vermont to a large extent went down the Sorel River to the St. Lawrence River and thence to Quebec. The forests of northern New York were extensively drawn upon for elm timber, which was hauled for twenty to forty miles by ox teams, in the winter, to the St. Lawrence, and on that stream was rafted

to Quebec. This elm timber business was carried westward until in recent years a supply has been drawn from as far west as Wisconsin. Pine deals have also been furnished the Quebec market from all the old white pine states of the United States, though, of course, in later years the Dominion has been about the only source of supply.

The export trade has always been so important a factor in the Canadian lumber industry, and the production of lumber has been to so large an extent from Crown lands, that the industry has been peculiarly subject to official regulation. One of the important phases of these regulations has been that relating to qualities of lumber and the up-building of a system by which relations between buyer and seller, producer, exporter and importer might be officially established. Thus has arisen the system of measurement and inspection known as Quebec culling. It is, perhaps, the most widely used of any system of lumber inspection in the world and, perhaps, of the widest reputation. It seems well, therefore, to give space for the more important provisions of this measure which has back of it the authority of the Dominion of Canada.

Survey, or inspection, is called "culling" in the Quebec market. Authority for the enforcement of the culling rules was derived from an act¹ of the Dominion Parliament, entitled "An Act Respecting the Culling and Measuring of Lumber in the Provinces of Ontario and Quebec." The application of this act is thus defined in section 3: "The provisions of this act apply only to the Provinces of Ontario and Quebec and do not apply to any place below the eastern end of the Island of Orleans."

The important portions of this act are as follows:

Square timber shall be measured only in some one of the three modes following, that is to say:—

First.—Measured off, in the raft or otherwise, giving the full cubic contents without any allowance or deduction;

Second.—Measured in shipping order—which shall mean sound, fairly made timber—gum seams closed at the butt and sound knots not to be considered unsoundness—lengths under the merchantable standard hereinafter mentioned and not less than twelve feet long to be received, if, in the opinion of the culler, the same is fit for shipment;

Third.—Culled and measured in a merchantable state, in accordance with the rules, standards and limitations hereinafter described.

In measuring timber, the culler employed for that purpose shall measure not only the girth of each piece of timber, but shall also measure, personally, with the aid of one competent assistant, the length of each piece of timber, in all cases

¹ Chap. 103—49 Vict.

where such measurement is practicable with the aid of only one assistant ; and in the event of any case arising in which, in the opinion of the supervisor, or of any deputy, such measurement cannot be effected with the aid of one assistant only, such culler may employ an additional competent assistant for that purpose, who, as well as the assistant first above mentioned, shall be approved of by the supervisor or deputy.

Every culler shall be provided with such measuring rods, tapes and other measuring instruments as are prescribed by departmental regulations, all of which shall be in accordance with the standard measures of Canada, and shall bear the verification marks of the Department of Inland Revenue :

Every culler shall also be provided with such scribing knives and such stamps as are necessary for marking the articles culled by him with the initials of his name, and with the capital letters distinguishing the quality, as follows :—

M. Which shall denote what is merchantable ;

U. Which shall denote what is sound and of merchantable quality, but under merchantable size ;

S. Which shall denote what is of second quality ;

T. Which shall denote what is of third quality ;

R. Which shall denote what is rejected and unmerchantable :

Such marks shall be indented or stamped on the end of each article of lumber culled in terms of the merchantable standard hereinafter prescribed, except as to West India and barrel staves, boards, deals, lathwood and handspikes.

Every culler shall check and examine the entry of his measurements and of culling and counting on the books of the supervisor, and sign such entry and calculations on the said books.

A copy of every agreement as to the adoption of any of the modes of measurement or culling mentioned in this Act, signed by the seller and buyer, shall be lodged in the office of the supervisor, or deputy supervisor, at the same time that a requisition is made to him for a culler to measure or cull any lumber, for the guidance of the supervisor, or deputy supervisor, and culler, in the performance of their duty,—and such requisition shall state the river and section of the Province wherefrom such lumber is produced ; but the owner of any lumber, or his agent, may cause it to be measured, culled or counted before any sale, in which case the specification of such lumber shall set forth the mode in which the measurement, culling or counting has been performed.

QUALITIES OF LUMBER.

In all cases the supervisor, deputy supervisor and cullers, respectively shall, in ascertaining and certifying the merchantable size and quality of lumber submitted to their culling, be governed by the descriptions, rules, standards and limitations following, that is to say :—

White Oak.—Square white oak timber, first quality, shall be free from rot, rotten knots affecting the surrounding wood, open rings and grub or large worm holes, but small worm holes and shakes shall be allowed according to the judgment of the culler ;

Second quality shall be oak not coming within the definition of first quality, and which, in the judgment of the culler, is not culls ;

Rock Elm.—Square hard grey or rock elm shall be free from rot, open rings

and rotten knots affecting the surrounding wood, but shakes and slivers shall be allowed according to the judgment of the culler;

White or Yellow Pine.—Square white or yellow pine timber shall be free from rot, rotten knots affecting the surrounding wood, worm holes, open shakes and open rings, but sound knots shall be allowed according to the judgment of the culler;

Red Pine.—Square red pine timber shall be free from rot, rotten knots affecting the surrounding wood, worm holes, shakes and splits, but sound knots shall be allowed according to the judgment of the culler;

Ash, Basswood and Butternut.—Square ash, basswood and butternut shall be of the same quality as white or yellow pine square timber;

Birch.—Square birch shall be free from rot, rotten knots, splits and shakes, and shall be allowed two inches wane;

Masts, Bowsprits and Red Pine Spars.—Masts, bowsprits and red pine spars shall be sound, free from bad knots, rents and shakes, and the heart shall be visible in spots at or near the partners;

Hickory Handspikes.—Hickory handspikes shall be six feet long, and three and a half inches square at the smaller end;

Ash Oars.—Ash oars shall be three inches square on the loin, and five inches broad on the blade, the blade shall be one-third of the length of the oar, and such oars shall be cleft straight on all sides, and free from large knots, splits and shakes;

Lathwood.—Lathwood shall be cut in lengths of from three to six feet, and measured by the cord of eight feet in length by four feet in height; and, to be merchantable, shall be free from rot, shall split freely, and each billet may contain to the extent of three or four open case knots, provided they run in line or nearly so, and it shall not have more than one twist;

Pine or Fir Boards.—Pine or fir boards shall not be less than ten feet in length, one inch in thickness and seven inches in breadth, equally broad from end to end, edged with a saw, or neatly trimmed by a straight line, and shall be free from rot, bad knots, rents and shakes, and of equal thickness on both edges from end to end; the color alone of any board shall not be a sufficient cause for its rejection, if it is in other respects sound and merchantable, and of the dimensions required by this Act;

White or Yellow Pine Deals.—White or yellow pine deals, to be merchantable, shall be free from rot, rotten knots, grub-worm holes, open case knots, shakes and splits (a slight sun crack excepted), and sound knots and hard black knots shall be allowed as follows: If they do not exceed three in number, and do not exceed on the average one inch and a quarter diameter; if they exceed three and are not more than six in number, and do not exceed, on the average, three-quarters of an inch in diameter; such proportion of knots shall be allowed for a deal eleven inches in width and twelve feet in length, and deals of greater or less dimension shall be allowed for in proportion, according to the judgment of the culler; wane equal to half an inch on one edge, if running the whole length of the deal, shall be allowed, and if not exceeding half the length of such deal, three-quarters of an inch wane shall be allowed; the deals shall be free from black or dead sap, with a slight exception, in the discretion of the culler;

Red Pine Deals.—Red pine deals, to be merchantable, shall be free from rot, rotten knots, grub-worm holes, open case knots and splits; several small sound

knots shall be allowed, according to the judgment of the culler; heart shake shall be allowed, if it does not run far into the deal or form a split through at the ends; they shall be free, or nearly so, from black or dead sap, but sound sap on the corners or on a portion of one face of a deal shall be allowed, according to the judgment of the culler;

Spruce Deals.—Spruce deals, to be merchantable, shall be free from rot, rotten knots, grub-worm holes, open case knots, splits and shakes,—a heart shake not exceeding one-fourth of an inch to half an inch in depth excepted; several small sound knots and hard black knots shall be allowed, according to the judgment of the culler, and in the exercise of such judgment he shall keep in view the peculiar nature of the wood, and govern his judgment accordingly; wane equal to half an inch on one edge, if running the whole length of the deal, shall be allowed, and if not exceeding one-quarter the length of such deal, three-quarters of an inch shall be allowed;

White or Yellow Pine, Second Quality Deals.—White or yellow pine second quality deals shall be free from rot, rotten knots and splits, with slight exceptions, at the discretion of the culler, and sound knots and hard black knots shall be allowed as follows: If they do not exceed six in number and, upon the average, one inch and a half diameter; if they exceed six and are not more than twelve in number, and do not exceed, upon the average, one inch and a quarter in diameter,—but small knots under half an inch diameter shall not be counted or considered; such proportion of knots shall be allowed for a deal eleven inches in width and twelve feet in length, and deals of greater or less dimensions shall be allowed for in proportion, according to the judgment of the culler; heart shakes and sun cracks not exceeding three-fourths of an inch to one inch in depth shall be allowed, as also worm holes, according to the judgment of the culler; wane of half an inch to one inch shall be allowed according to the quality of the deal in other respects, according to the judgment of the culler; deals rejected as not coming within the standard of merchantable or second quality shall be classed as culls,—except that the culler may, if requested by buyer and seller, select and classify, as third quality, the best of the deals so rejected;

Spruce and Red Pine, Second Quality Deals.—Spruce and red pine second quality deals, shall be deals not coming within the definition of merchantable, and which, in the opinion and judgment of the culler, are not culls, and shall be classed as second quality; and the culler, if required by seller and buyer, may select and classify as third quality the best of the deals unfit to be seconds;

Quebec Standard Hundred of Deals.—The Quebec standard hundred of deals shall be one hundred pieces twelve feet long, eleven inches broad, and two and a half inches thick; and deals of all other dimensions shall be computed according to the said standard; deals of all qualities shall be not less than eight feet long, seven inches broad and two and a half inches thick; deal ends shall be not less than six feet long and shall be computed according to the Quebec standard;

Merchantable Deals.—All merchantable deals shall be well sawn and squared at the end with a saw, and the color alone shall be no objection to their being merchantable;

To be Stamped.—All deals when culled shall, in all cases, be stamped with the initials of the culler, and the capital letter denoting their quality as such;

Marking of Spruce and Other Deals.—Spruce deals, if not sawn at the ends prior to or at the time of culling, shall be marked with the capital letter, denoting their respective qualities, with red chalk, in large bold letters; and to prevent mistakes in piling, all other deals shall be marked with bold strokes in red chalk as follows:—

- Merchantable shall be marked, I;
- Second quality shall be marked, II;
- Third quality (if made) shall be marked, III;
- Rejected or culls shall be marked, X;

STANDARD OR MEASUREMENT STAVES.

Standard or measurement staves shall be of the dimensions set forth in the words and figures following:—

5½	feet long, 5 inches broad, and from 1 to 3 inches thick.
4½	do. 4½ do.
3½	do. 4 do.
2½	do. 5 do.

HEAD STAVES.

Head staves, five and a half feet long, and four and a half inches broad, shall be received as if of merchantable dimensions;

STANDARD MILLE.

The standard mille shall be twelve hundred pieces of five and a half feet long, five inches broad, and one and a half inches thick; and standard or measurement staves of other dimensions shall be reduced to the said standard by the tables of calculation now used;

WEST INDIA OR PUNCHEON STAVES.

West India or puncheon staves shall be three and a half feet long, four inches broad, and three-fourths of an inch thick;

QUALITIES REQUISITE IN ALL STAVES.

All staves shall be straight grained timber, properly split, with straight edges, free from the grub or large worm holes, knots, veins, shakes and splinters; and small worm holes which do not exceed three in number, shall be allowed according to the judgment of the culler, provided there are no veins running from or connected therewith, and the culler shall measure the length, breadth and thickness of standard staves at the shortest, narrowest and thinnest parts; and the thickness of West India and barrel staves exceeding the standard breadth shall be measured at such standard breadth, to wit: Four and three and a half inches respectively, provided the thinnest edge is not less than half an inch;

DIMENSIONS OF MERCHANTABLE TIMBER.

The dimensions of merchantable timber shall be as set forth in the following words and figures:—

Oak.—Oak shall be at least twenty feet in length and ten inches square in the middle;

Elm.—Elm shall be at least twenty feet in length and ten inches square in the middle;

White Pine.—White pine shall be at least twenty feet in length and twelve inches square in the middle, and fifteen feet and upwards in length, if it is sixteen inches square and upwards in the middle;

Red Pine.—Red pine shall be at least twenty-five feet in length and ten inches

square in the middle, and twenty feet and upwards in length, if it is twelve inches square and upwards in the middle ;

Ash, Basswood and Butternut.—Ash, basswood and butternut shall be at least fifteen feet in length and twelve inches square in the middle, and at least twelve feet in length, if it is fifteen inches square and upwards in the middle ;

Birch.—Birch shall be at least six feet in length and twelve inches square in the middle ;

TAPER OF MERCHANTABLE TIMBER.

Taper of merchantable timber :—

Oak, 3 inches, under 30 feet, and in proportion for any greater length.

Elm, 2 do. for 30 do. do. do. do.

White pine, 1½ do. for 20 do. do. do. do.

Red pine, 2 do. for 25 do. do. do. do.

Ash, basswood and butternut, 1½ inches, under 20 feet, and in proportion for any greater length.

Bends or twists not to exceed one in number ;

HOLLOW ALLOWED.

Hollow allowed on merchantable timber :—

Oak, 3 inches for every 20 feet in length, and in proportion for any greater length ;

Elm, 3 inches for every 20 feet in length, and in proportion for any greater length ;

White pine, 2½ inches for every 20 feet in length, and in proportion for any greater length ;

Red pine, 3 inches for every 20 feet in length, and in proportion for any greater length ;

Ash, basswood and butternut, 2½ inches for every 20 feet in length, and in proportion for any greater length ;

DIMENSIONS OF MASTS, BOWSPRITS AND RED PINE SPARS.

White pine masts of 23 inches and upwards at the partners, shall be 3 feet in length to an inch in diameter ;

22 inches do. 3 feet do. do. and 2 feet extreme length ;

21 do. do. 3 feet do. do. and 3 feet do.

20 do. and under 3 feet do. do. and 4 feet do.

Hollow or bend not to exceed six inches for seventy feet, and in proportion for any greater length ;

Bowspits shall be two feet in length for every inch in diameter at the partners, adding two feet for extreme length ;

Red pine spars shall be three feet to the inch in diameter at the partners, and nine feet extreme length ; hollow not to exceed seven inches for sixty feet, and in proportion for any greater length.

REWORKING.

Whenever it appears that timber, masts, spars, boards, planks, deals, staves, oars or any other description of lumber, are not properly hewn, squared, butted or edged, but are merchantable in other respects and sold as such, the supervisor, deputy and culler, respectively, shall order or cause the same to be properly dressed and chopped, at the expense of the seller or the buyer, as the case may be, previ-

ously to their being respectively received and certified to be merchantable; and such dressing and chopping shall be done under the direction of the culler in charge of the measuring or culling.

SURVEY IN CASE OF DISPUTE.

If any dispute arises between the first buyer or seller, or the person making the requisition, and the culler employed to cull or measure any article of lumber, with regard to the dimensions or quality thereof, the supervisor or deputy shall, as soon as possible, upon a written complaint thereof being made, demanding a survey, cause a board of survey to be held for examining the quality and dimensions of such lumber; and such board shall take into consideration the position of such lumber when measured or culled, and all other circumstances and considerations connected therewith, in reporting thereon; and such board shall consist of three persons,—one to be appointed by the culler whose decision is disputed, one by the person complaining, and one by the supervisor or deputy,—and their determination shall be final and conclusive; and if the opinion and act of the culler is confirmed, the reasonable costs and charges of re-examination shall be paid by the person complaining, but if otherwise, by the culler:

WHEN SURVEY MUST BE DEMANDED.

Such survey shall be demanded when the culling or measuring is completed, or within two lawful days after the person demanding the survey has been furnished with the specification thereof; and such right of survey shall cease on and after the fifteenth day of November in each year:

APPOINTMENT OF CULLER.

The supervisor or deputy, for the more expeditious settlement of disputes, may, with the consent and at the request of buyer, seller and culler concerned, name one culler to act as surveyor; and if the culler so named is not objected to by any of the persons interested, he shall act in the capacity of a board of survey, and his determination shall be final and conclusive.

COLLECTION OF FEES AND CHARGES.

The fees and charges fixed by the Governor in Council shall be charged and collected by the supervisor and deputy supervisor, as the fees and charges for culling, measuring or counting off each description of lumber, and for making out specifications, and shall include all charges and expenses against such lumber, except in cases where extra labor for canting, dressing, butting, chopping and piling is necessary and required:

BY WHOM AND WHEN PAYABLE.

One-half of such fees and charges shall be paid by the buyer, and the other half by the seller; but the whole of such fees and charges shall, in all cases, be paid to the supervisor or deputy, on the delivery of the specification or on the presentation of an account thereof, by the person, or by the persons jointly or severally, who filed a requisition or order for such measuring, counting or culling, whether such person or persons are buyers, sellers, owners, or possessors of such lumber.

CULLING NOT COMPULSORY IN CERTAIN CASES.

Nothing in this Act shall make it compulsory to have any article of lumber measured, culled or assorted, under this Act, if such lumber is shipped for exportation by sea for account, in good faith, of the actual and *bona fide* producer or

manufacturer thereof; but all other lumber shipped for exportation by sea, shall be either measured, culled or counted, at the option of the persons interested, by a licensed culler, under the control and superintendence of the supervisor or deputy; and the owner or shipper of such lumber, or the proprietor or lessee of the premises from which such lumber is so unlawfully shipped, shall incur a penalty equal to the market value of any article of lumber so unlawfully shipped.

CHAPTER XI.

QUEBEC—PERSONNEL.

Previous chapters have dealt with physical features, with forests, with history of development and administration and with statistics, but no history can be complete without reference to the men who have done the things recorded. It has not seemed necessary or advisable to make the personal element prominent in a work of this character, but in order to link the past with the present and to indicate the forces which are still carrying ahead the lumber development of the Province of Quebec the following brief sketches of individuals, firms or companies that once were or are now prominent in the industry are presented. Some of them were pioneers; some of them are occupying a growing place either in lumber manufacture or in lumber commerce; but all are deemed worthy of mention in a work of this character.

THE MONTMORENCY MILLS.

Early in the Nineteenth Century the English government sent several practical men to Canada to procure timber for shipbuilding. One of these men was Peter Patterson, who, later, in connection with Henry Usburne in the year 1811, purchased the site of the famous Montmorency sawmills, at the foot of the Falls of Montmorency, near the City of Quebec. Subsequently Mr. Patterson conducted the business on his own account for a period of forty years, when he died. He was succeeded by the late George Benson Hall, who conducted six mills at the same place until his death in 1876, after which the mills were operated by Andrew Thomson, Patterson Hall and George Benson Hall, under the firm name of G. B. Hall & Co., until 1884, when Patterson Hall and H. M. Price, under the name of Hall & Price, leased the mills and continued them until 1892, when they were shut down. In 1894 the buildings were bought by Mr. Price and pulled down by him. The Montmorency Cotton Works now occupy the site.

H. M. PRICE.

H. M. Price, after the Montmorency mills were closed, bought the Whitton, East Broughton and Lyster mills, which he continued to operate until about twenty-four years ago, when he sold out to his manager, D. H. Pennington, an old Montmorency man who has since built

another mill in the same neighborhood, all now being operated to their full capacity. Mr. Price, though still in the deal business, is largely engaged in the production of pulpwood, and is president of the Pulpwood Association of Quebec Province.

HAMILTON BROS.

George Hamilton, one of the earliest in the trade, bought the Hawkesbury mill property, on the Ottawa River, in 1811, and at his death the business—a general deal and lumber business—was carried on by his three sons, Robert, George and the Hon. John Hamilton. The business became one of the most extensive on the Ottawa River, and the whole of the mill's cut was brought to the Quebec market for exportation to Great Britain. Some years before the firm retired from business, John, the son of the late Robert Hamilton, became a partner. He is still living in Quebec and is chancellor of the University of Bishop's College, Lennoxville, Quebec, where he graduated with the degrees of master of arts and doctor of civil law.

HENRY ATKINSON.

In the early part of the Nineteenth Century, Sir John Caldwell, the Receiver General of Lower Canada, opened two lumbering establishments—one on the Etchemin River and the other on the St. Nicholas. For the double purpose of bringing down logs and for an additional supply of water for his mills, at the foot of the St. Nicholas Falls he constructed a canal about five miles long from a tributary of the Chaudiere to the St. Nicholas River. In 1821 Charles King, father of the members of the present firm of King Bros., Limited, came over from England and took charge of the St. Nicholas establishment for Sir John, and at about the same time John Thomson, father of Andrew Thomson, now president of the Union Bank of Canada, came from Boness, Scotland, and took charge of the Etchemin establishment. After the return of Sir John Caldwell to England, the St. Nicholas mill fell into the hands of the late William Gerrard Ross, and the Etchemin mill into the hands of the late Henry Atkinson, uncle of the present proprietor, Henry Atkinson, who still conducts that valuable property.

JOHN BREAKKEY.

The St. Nicholas mill, like the Montmorency mills, has long been dismantled, the tendency at present being to take the mill to the logs instead of, as in the past, bringing the logs to the mill. Following up this practice, Charles King, in partnership with H. D. Breakey, father of the present owner of this property, John Breakey, built in 1846 the

existing mills on the Chaudiere River, several miles south of the St. Lawrence River (at a point about six miles from Quebec City), whence the deals were started down to the Chaudiere Basin on the St. Lawrence for shipment. Subsequently the property became that of Henry King and John King, and upon the death of the former, Mr. Breakey succeeded to the ownership, which he still maintains. This mill is one of the largest if not the largest spruce deal mill in the Province of Quebec.

THE THOMSONS.

Some time after John Thomson, before referred to, left Etchemin, he took two of his sons into partnership with him—Andrew and John Thomson—under the firm name of Thomson & Co., and they purchased the Buckingham mill property in conjunction with the Hamilton brothers, and conducted on a large scale a pine deal business. These deals were taken down to Quebec in moulinettes and piled or shipped from the river at the New Liverpool cove. When the partnership between the Hamiltons and the Thomsons was dissolved, the Thomsons bought Victoria cove, on the north side of the St. Lawrence, where they carried on business until they retired over a quarter century ago.

KING BROS., LIMITED.

King Bros., Limited, with headquarters at Quebec City, are extensive manufacturers of spruce and pine, and have been in the trade for many years, the firm having been established in 1829 by the late Charles King, who erected his first mill at St. Antoine de Tilly in the Province of Quebec. At present there are two partners in the firm—Edmund Alexander King and Charles King, with W. S. Thomas as vice president and general manager of the business. King Bros. are noted for their careful and reliable selection of shipments, and their operations have been carried on over a large area and in various localities of the Province of Quebec. The late James King, who was a partner up to the time of his death about ten years ago, was a member of the Provincial Legislature for Megantic for several years, and was well known to the trade both at home and abroad.

W. & J. SHARPLES.

W. & J. Sharples (Hon. John Sharples) is one of the oldest firms in the Quebec square timber trade, having been established in 1830 by William Sharples, of Liverpool. The business was afterward taken over by his son, Henry Sharples, about 1840. Richard Wainright and Charles Sharples, and afterward the late Hon. John Sharples, next conducted the business and subsequently the latter's sons,

only one of whom remains in the timber export trade, the Hon. John Sharples, who is the sole proprietor of the business carried on under the style of W. & J. Sharples. He was born in Quebec in 1847. He entered the firm in 1871, and under his management the business has been greatly extended.

The firm ships about 2,000,000 cubic feet of square and waney timber of all kinds during the season of navigation, and about 50,000,000 feet board measure of pine deals and sidings. The firm possesses two coves at Quebec—the Sillery cove, which is devoted to the shipment of square and waney timber, and Bridgewater cove, where there are large piling grounds for deals and lumber.

The name of Sharples has been prominently before the public in connection with the timber and lumber export trade of Canada for nearly three-quarters of a century. The development of the business of this concern from comparatively small beginnings has been something phenomenal. The establishment transacts the greater part of its trade with the United Kingdom, but business relations are maintained also with certain commercial centers in continental Europe. There are branch offices at Montreal and Ottawa, and the firm has agencies in Glasgow, London and Liverpool.

The Hon. John Sharples is a member of the Legislative Council of the Province of Quebec, to which he was nominated in 1893, and of the Quebec Board of Harbor Commissioners; vice president of the Union Bank of Canada and of the Quebec Auditorium; a director of the Quebec Bridge Company; president of The Chronicle Newspaper Company; mayor of the suburban town of Sillery, and was, until he resigned recently, vice president of the Great Northern railway of Canada.

J. BURSTALL & CO.

J. Burstall & Co. is one of the oldest Quebec firms engaged in the export of wood goods from Canada, having been established in the City of Quebec by the late Henry Burstall, in the year 1832, nearly three-quarters of a century ago. He came from Hull, England, and was shortly afterward joined by his brother Edward. The business was carried on for many years under the style of H. & E. Burstall. On the retirement of Henry Burstall in 1856, it was changed to E. Burstall & Co. In 1857 John Burstall, a nephew of the brothers, was admitted as a partner, and when a few years afterward Edward Burstall retired, it was again changed to J. Burstall & Co., and has so remained ever since.

About the year 1863 Stanley Smith, of Liverpool, joined the firm and continued as a partner for ten or twelve years, when he retired. W. H. Robinson then became a member, as representing Harrison, Robinson & Co., of Liverpool. Mr. Robinson died in 1876, and the following year F. Billingsly, for many years in the employ of the firm, was admitted into partnership, along with H. T. Walcot. The latter remained in the firm fourteen years, and the former until his death in 1903. John Burstall, who had been head of the firm for about thirty-five years, died in England in 1896. The business is now conducted by John F. Burstall, his son. The firm has a branch office in Montreal and another in London, England. It has for more than a half century done a large annual export trade, and before the development of the steam carrying trade, for a long period of years, exported annually to Great Britain from 120 to 200 cargoes of timber and deals.

NICHOLAS FLOOD.

One of the oldest living operators in the timber and deal trade of the Province of Quebec is Nicholas Flood, a resident of the Ancient Capital, who, in the successive capacities of culler and manufacturer, has been identified with this industry for more than a half century. Mr. Flood was born in Wexford, Ireland, and immigrated to Canada with his parents at the age of eight years. A year later, at the tender age of nine, he began his apprenticeship as a culler's assistant at Walker's cove, Quebec. His unusually active career covers the most prosperous period of the Quebec export timber trade. For many years he received for the owners at Cape Rouge cove, at Quebec, from 7,000,000 to 13,000,000 feet of board pine each season, and about twelve years ago succeeded to the management, which office he still holds.

PRICE BROS. & CO., LIMITED.

Price Bros. & Co., Limited, of Quebec, are the largest lumber operators in spruce in the Province of Quebec, having sawmills in all the principal lumbering districts east of the Ottawa, and are also the largest individual limit holders in Canada. The company has a paid up capital of \$2,000,000. The total appraised value of the assets of the company is \$4,500,000. The value of the freehold lands, seigniories and timber limits alone is in excess of \$3,000,000. These lands schedule over 100,000 acres. The limits operated under license schedule over 6,000 square miles. The timber consists principally of spruce, balsam, cedar, birch and a small amount of pine, poplar and hemlock. The

predominating wood is spruce, a large part of the limits being included in the great spruce belt of Canada. The timber is located in a district where the rapidity of growth is probably greater than anywhere else in North America, so that a tract may be gone over again in fifteen or twenty years. The company has mills at the following places, all in the Province of Quebec: Batiscan, St. Thomas, Cape St. Ignace, Rimouski, Matane, Salmon Lake, Metabetchouan, Chicoutimi, L'Anse au Cheval and St. Catherine's Bay. In addition to the sawmills, the company owns one of the largest pulp mills in Canada, located at Rimouski.

The founder of this business, the late William Price, in 1840 established the mills at Chicoutimi, St. Alexis, L'Anse St. Jean and St. Etienne, on the Saguenay, and at Metis, Matane, St. Thomas, Batiscan and other places, leaving an immense business to his sons, the last of whom, Hon. E. J. Price, died about six years ago, at which time his nephew, William Price, succeeded to the business, which, during the latter part of 1904, was converted into a limited stock company, with Mr. Price as president.

On the far famed Saguenay the company has four mills, from which it ships its well known spruce deals. This remarkable river is navigable for ships of the deepest draft for sixty miles. On account of the swift current, a powerful tug is provided for the convenience of ships coming up to load, there being no possible anchorage on the river except at the mills. The Chicoutimi mill is situated in the town of that name at the head of navigation. The mill at Grand Bay (or Ha-Ha Bay) is driven by water power. The other mills on the Saguenay, as already stated, are situated at L'Anse St. Jean and St. Etienne. The total capacity of these mills is 20,000 standards per season. The Metis steam mill is about two hundred miles below Quebec, on the south shore; the Matane mill, about two hundred and thirty miles; these and the Salmon Lake mill, on the Matapedia River, have a capacity of about four thousand standards each. A few years ago a new steam mill was built at Trois Pistoles, about one hundred and thirty miles below Quebec, on the south shore of the St. Lawrence. The capacity of the mill is from 2,000 to 3,000 standards. The mill at Cape St. Ignace (steam power) and the mill at Trois Saumons have a joint capacity of about two thousand standards. The shipments of the company are chiefly to Great Britain, the Continent, South America and Australia, and its agents in the United Kingdom are Price & Pierce, of London.

William Price takes an active interest in all commercial matters relating to the development of Canada. He has been president of the Quebec Board of Trade, is honorary commodore of the Quebec Yacht Club, vice president of the Quebec Steamship Company and was a candidate in the Conservative interest for the county of Rimouski in the general elections for the Dominion of Canada in 1904.

William Price succeeded his uncle, the Hon. E. J. Price, as president of the A. Gravel Lumber Company, Limited, which has a large modern mill on the south shore of the St. Lawrence River, a few miles from Quebec City. It manufactures all kinds of lumber, including spruce, birch, etc., and box boards for the English market and all kinds of joinery for local consumption. Agencies are maintained in Boston, New York and London.

G. B. SYMES & CO.

The well known firm of G. B. Symes & Co. was established in Quebec about the year 1840, and was composed of George Burns Symes and D. D. Young, both of whom were English born. They were shippers of all kinds of timber and lumber, and operated largely in the shipping interests of the port. Upon the death of Mr. Symes, A. F. A. Knight, the firm's bookkeeper, became a partner with Mr. Young under the name of D. D. Young & Co. This firm was succeeded, upon the retirement of Mr. Young, by A. F. A. Knight & Co., which firm went out of business over a quarter century ago.

THE BENSONS.

The name of Benson has long been familiar in connection with the timber and shipping interests of the port of Quebec. W. J. C. Benson, came to Canada from London, England, about sixty years ago, and began a business career which, though brief, was extraordinarily active. He was one of the largest if not the largest shipper in the port for five years, when he died at the early age of thirty-three years. He shipped from 100 to 110 cargoes each season during this period. He built several ships at New Liverpool cove, Quebec, which property he owned, in the palmy days of the wooden ship industry. His cargoes of wood goods embraced square pine, deals, staves and lathwood. At the time of his death, about 1850, Joseph Roberts, who had been Mr. Benson's agent both in Quebec and in England, entered into partnership with Thomas Benson (a brother of the former) and R. H. Smith, under the firm name of Benson & Co. The new enterprise was very successful, and the firm's cargoes reached the extraordinary number of 140 in a

single season. The business continued until the retirement of Thomas Benson, when the two remaining partners continued the business under the name of Roberts, Smith & Co., their operations being extensive for upward of twelve years, when Mr. Roberts retired and returned to England in 1880. At this time E. Harper Wade (now manager of The McArthur Export Company, of Quebec) became a partner with Mr. Smith under the style of Smith, Wade & Co. Mr. Smith retired after six years, and H. T. Walcot (now representing The McArthur Export Company in London, England) joined Mr. Wade under the old firm name, and the business was continued until 1890, at which time it was wound up.

DUNN & CO.

The business of Dunn & Co. was established over a half century ago by the late Timothy Dunn, who was the doyen of the timber trade of the port of Quebec. Stuart H. Dunn, his oldest son, is now the sole proprietor of the firm. This concern draws its supplies of timber from Ohio and West Virginia, and is agent for certain hardwood lumbermen of the United States whose makes are of standard excellence and in good repute abroad. Dunn & Co. are probably more largely interested in the oak timber trade than any other firm in the City of Quebec.

The late Timothy Dunn was born at St. Ursule, Quebec Province, in 1816. In 1841 he entered the Quebec office of the great timber firm of Calvin, Cook & Counter, and later became the head of the firm of Dunn, Calvin & Co. Afterward, in conjunction with the late Thomas Benson, he transacted business under the name of T. H. Dunn & Co., and in 1860 formed a new partnership with the late William Home, the firm being Dunn & Home. The firm was succeeded by his two sons, the late Logie H. Dunn and Stuart H. Dunn, under the present name of Dunn & Co.

HENRY FRY & CO.

A notable firm closely associated with the commercial life of the port of Quebec for over a half century is that of Henry Fry & Co. The firm was established by Henry Fry in 1854, as timber merchant and ship owner. The founder having been joined by his brother in 1861, both continued to carry on this business on an extensive scale. In 1877 it happened, however, that, owing to ill health, Mr. Fry was prevented from taking an active part in the operations of the firm, and from that date until 1882 the management and direction of the business was in the hands of E. C. Fry. In the year last mentioned it was deemed

advisable for the senior partner to retire for a much needed and well earned rest, and, in consequence, the firm was dissolved. At about this time Robert Stanley, who had been associated with the business since 1862, was admitted as a partner, and, with E. C. Fry, has since successfully conducted the present business of general commission merchants. E. C. Fry was appointed a member of the Transportation Commission created by the Canadian government in 1903.

THE WILSONS.

Matthew Isaac Wilson and his brother, Charles William Wilson, formed a partnership under the firm name of Wilson Bros. & Co., on March 7, 1854. This partnership was formed in Liverpool, and a business in timber, deals, staves and general cargoes was conducted in both Liverpool and Quebec, with C. W. Wilson in charge of the Canadian branch. The firm acquired Dalhousie and Glenburnie coves in Quebec, and built several ships. About a year afterward the partnership was dissolved, when C. W. Wilson continued as agent in Canada for his brother in Liverpool until 1866, when the former went into the business on his own account, retaining the coves mentioned, building ships and carrying on a general export business, the cargoes embracing largely timber, deals, staves, etc. The Wilsons have loaded as many as 140 cargoes in a single season. J. P. Bickell, who was a clerk in the firm's offices, became a partner with M. I. Wilson and represented the business as selling agent in England. The business of C. W. Wilson in Quebec was wound up in 1885, and that of the Liverpool house in 1895. The brothers were among the best known merchants and shipbuilders in the history of these important industries. W. H. Wilson, oldest son of C. W. Wilson, in the year in which his father retired formed a partnership with John S. Murphy as J. S. Murphy & Co., which continued up to 1895, when the senior partner died, and W. H. Wilson, with his brother Fred, formed a partnership in a commission and agency business, which is still in existence, having headquarters in Quebec City.

DOBELL, BECKETT & CO.

Among the notable firms that have long held a prominent place in the Canadian timber export trade, that of Dobell, Beckett & Co. is most familiar. The Quebec house was founded nearly a half century ago by the late Hon. R. R. Dobell and the late Thomas Beckett. The firm has branch offices at Montreal and Ottawa and representatives in Great Britain. Its annual shipments from the ports of Quebec and Montreal amount to, in timber and lumber, hundreds of millions of

feet. The Quebec establishment is one of the leading commercial inheritances of the port.

The late Hon. R. R. Dobell was senior member and active head of the enterprise, and to his personal activity and commercial ability the firm in a large measure owes its prominence, stability and wide spread reputation. In the partnership were, in more recent years, T. Stevenson, Lorenzo Evans and W. Molson Dobell. Since the death of the two principals a few years ago, the Canadian business has been carried on by L. Evans, W. M. Dobell and R. W. Beckett, and the London, England, business by Mr. Stevenson.

Hon. R. R. Dobell represented Quebec West in the Canadian House of Commons for several years, and was also a minister of the Federal government. His absorption in the duties of state as well as those of membership of the Quebec Harbor Commission and Board of Trade, latterly placed the firm's business, to a large extent, in the hands of his associate partners in Quebec.

The firm possesses some fine cove property at Sillery, where, during the season of navigation, much activity prevails in connection with the dressing and loading of timber.

SIR HENRI JOLY DE LOTBINIÈRE.

The seigniory of Lotbinière, in the Province of Quebec, is one of the oldest in Canada, having been in the possession of the de Lotbinière family since the year 1673. The seigniory is situated on the right bank of the St. Lawrence River, about forty miles west of the City of Quebec, and embraces an area of 87,000 acres of forest. It is the ambition of the de Lotbinières to work this forest in a scientific and conservative manner so as to secure its perpetuity for many years to come. Their contention is that any one holding freehold or patented timber lands should work them simply for the revenue and not with the idea of converting them, with as short delay as possible, into cash; that no better investment can be found at the present time than timber lands, particularly when easy of access and exploitation; that a timber limit if properly managed should have no finality; that conservative felling will ensure the perpetuity of a forest, be it large or small; that a strict attention to a rational felling diameter and careful supervision against the lumberman's greatest enemy, fire, constitute the two essential features necessary to perpetuate the existence of a forest.

Henri Gustavus Joly de Lotbinière built a mill and began operations on the property in the year 1830, taking large quantities of pine and

spruce deals to the Quebec market. His son, Sir Henri Joly de Lotbinière, continues the business with the assistance of his son, E. G. Joly de Lotbinière.

Sir Henri Joly de Lotbinière, present head of this house, and one of the most distinguished public men of Canada, is widely known as a zealous and practical advocate of forestry. Sir Henri was born in France in 1829 of Huguenot ancestry, and came to Canada when a young man. He was admitted to practice at the Quebec bar in 1855, and was returned as a Liberal to the Canadian Assembly in 1861 for the county of Lotbinière. He took a prominent part in the agitation preceding the confederation of the provinces, to which measure he was strongly opposed. For a number of years he was a member of the Quebec Legislature, and in 1878 became Premier of that Province but was defeated the following year. After a protracted retirement from public life, he reëntered the field in 1896, and was elected to the House of Commons as a supporter of Sir Wilfrid Laurier. He was made Lieutenant Governor of British Columbia in 1900, which position he now holds.

Sir Henri has written and spoken frequently in connection with forestry, horticulture and kindred topics, displaying a knowledge largely based upon practical experience and personal research, and has taken an active part in connection with organizations for the promotion of these objects.

E. G. JOLY DE LOTBINIÈRE.

The active connection of E. G. Joly de Lotbinière, son of the above, with the lumber industry covers a period of barely ten years. Prior to that time he practiced law at Quebec. When, in 1896, his father accepted a seat in the Laurier cabinet, he gave up law and devoted himself to the management of the seignior of Lotbinière. He has also taken an active interest in the work of the Canadian Forestry Association for several years past, and has the honor of representing the association as president for the current year (1905). He was born November 12, 1859. His mother's name was Margaretta Gower. He was married in 1885 to Lucy Geils Campbell, eldest daughter of the late W. D. Campbell, N. P., of Quebec.

He maintains the traditions of his family in the management of the family property, the seignior of Lotbinière, and in his public capacity suggests regarding Crown land forests that a rigid enforcement of the existing rules and regulations, the setting aside of extended areas as

perpetual forest reserves and a vigorous fire protection service should ensure for posterity the advantages which are yet happily enjoyed in the Province of Quebec.

D. R. M'LEOD.

D. R. McLeod has been in business as a broker between manufacturers and shippers of timber for nearly a half century. He was at one time a shipper and is still largely interested in the trade at Quebec.

WILLIAM POWER, M. P.

Canada allows no adventitious circumstance of birth or fortune to be a bar to the progress of her deserving sons. A notable example of this is the career of William Power. He was born in 1849 at St. Colomb de Sillery, a suburb of Quebec City, and was educated at the parochial school of his native parish and at the Quebec Commercial School. When but a lad he entered the offices of W. & J. Sharples, the well known lumber merchants. Here he displayed such business ability that at the age of seventeen he was promoted to a more important position in the company's employ, and is now, as he has been for several years, manager of the Sharples business. Mr. Power has been identified with the timber trade of Quebec for nearly forty years. He is a practical lumberman, having spent several years in the pine forests of Canada and of Michigan, supervising the work there carried on by the Sharples employees. He visits the timber markets of Great Britain each year in the interest of his firm.

It would hardly be expected that a man who has shown so many excellent business qualities would be allowed to remain altogether in the comparatively quiet sphere of a business life, and so, not only has he been for many years a member of the parish Municipal Council of Sillery, but, on the death of Hon. R. R. Dobell, member of Parliament for the city district of Quebec West and a prominent timber merchant, Mr. Power was elected as his successor. He has since been reëlected by his constituency at the general elections for the Dominion Parliament in 1903.

Mr. Power is associated with Mr. Sharples and Harcourt Smith in an important business known as the River Ouelle Pulp & Lumber Company, which owns two mills on the River Ouelle, on the line of the Intercolonial railway below Quebec City.

E. HARPER WADE.

Edward Harper Wade, who arranged the formation, a few years ago, of the McArthur Export Company, Limited, in the City of Quebec, and

now holds the position of general manager of this concern, is a native of Liverpool, England. In 1862 he entered the offices of Sharples & Co., in his native city of Liverpool. In 1870 he was transferred to Quebec, Canada, and remained with the Sharples firm in that city until the end of 1877, visiting England each winter and taking an active part in the timber business as a salesman. He then accepted a similar position with Roberts, Smith & Co., of Quebec, and remained with them until the retirement of Joseph Roberts, in the year 1880, when he was taken into partnership by R. H. Smith, of the same city, and for six years carried on business under the style of Smith, Wade & Co. On Mr. Smith's retiring, H. T. Walcot, who had been a partner in the business of J. Burstall & Co., joined the firm. Subsequently, in 1890, Mr. Walcot became agent in England of the McArthur Bros. Co., Limited, and Mr. Wade the manager of the Quebec and Montreal business of the same concern.

CARBRAY, ROUTH & CO.

Carbray, Routh & Co., of Quebec and Montreal, have been engaged in the business of general commission and shipping for nearly forty years. They are also selling agents for several important sawmills, and have done a large business with Great Britain, France, Portugal, Australia and South America. Mr. Carbray is a prominent man in public life, and for many years represented the business division of the City of Quebec in the Parliament of the Province of Quebec. He is also consul for Portugal at Quebec, while Mr. Routh fills the same position as Portuguese representative in Montreal.

THE EDSON FITCH COMPANY.

Edson Fitch & Co. was established at Montmorency, a few miles east of the City of Quebec, in 1867. In 1869 the plant and works were moved to Etchemin, on the south shore of the St. Lawrence River about four miles west of Quebec, where the establishment has steadily grown in importance. Mr. Edson Fitch is an American and has invested the industry with a spirit of enterprise so characteristic of his nationality. In 1886 Edson Fitch & Co. was converted into The Edson Fitch Company, and has so continued ever since. The specialty of the works is the manufacture of match splints, shooks and match blocks. Enough splints and blocks are manufactured daily to produce 80,000,000 matches, and in the manufacture of splints and cases about 20,000,000 feet of lumber are used a year. The company maintains business relations with the United Kingdom, the West Indies and South America.

BENNETT & CO.

Bennett & Co., manufacturers' agents, have been in business in the City of Quebec for over thirty years. The two partners are sons of the late Benson Bennett, who was well known as the largest mill owner and manufacturer of pine and spruce deals in Quebec. Among the various mills for which Bennett & Co. have acted as agents are those of Sir Henri Joly de Lotbinière, in the seigniorship of Lotbinière, and the Hon. J. K. Ward, of Montreal, for both of whom they have been agents for many years.

HAROLD KENNEDY.

Harold Kennedy, who has been established in the port of Quebec for nearly a quarter of a century, is identified with the timber export trade. He is the owner of Indian cove, one of the best properties of the kind in the port, which was occupied at one time by the Gilmour Company. Mr. Kennedy came to Quebec from his native city of Liverpool to represent Taylor, Pierce & Co., of that place, who were the successors of James Bland & Co. He is a manufacturer and shipper of pine and spruce deals and pine and birch timber, and an owner of large limits in the Province of Quebec. He has for his Montreal agents McLean, Kennedy & Co. As ship owners' agent he acts for the following well known lines of steamers: Head Line, Belfast and Dublin; Moss Line, Liverpool; Malay & McIntyre, Greenock and Glasgow; Holme Line, of Maryport, and represents many owners of tramp steamers trading with the St. Lawrence. Mr. Kennedy is a member of the Quebec Harbor Commission, president of the McArthur Export Company, Limited, and vice president of the Quebec-Jacques Cartier Electric Company. He was appointed by the Federal government in 1903 as a member of the Dominion Transportation Commission, but, owing to business engagements, was obliged to decline the honor.

H. R. GOODDAY & CO.

Nearly twenty years ago H. G. Goodday, of London, England, engaged in the lumber export business with E. W. Benson. The firm of Goodday, Benson & Co. was dissolved in 1894, when H. R. Goodday, a son of the senior member of the firm, continued the business under the firm name of H. R. Goodday & Co. In 1899 he entered into partnership with H. C. Foy, who is a son of the head of the well known firm of Foy, Morgan & Co., of London, England, under the style of H. R. Goodday & Co. The specialty of this firm is spruce deals, getting its supplies from Canadian forests. It also handles hardwoods and

other lumber. Its trade is principally in the United Kingdom and the chief centers of business on the Continent. Foy, Morgan & Co., London, England, are the firm's agents in London and on the Continent.

J. BELL FORSYTH.

J. Bell Forsyth is a name well known in Canada from the publication for so many years of the annual statistics of the timber and lumber trade of Quebec by the late firm of J. Bell Forsyth & Co., who were for many years engaged in the commission business in lumber. The annual statement is still continued under the old name, but Mr. Forsyth is now the collector of customs for the port.

ALEXANDER BAPTIST.

About half way between Quebec and Montreal, at Three Rivers, are the well known mills of Alexander Baptist, who, on account of the extensive limits he has owned, has been styled the "Lumber King of the St. Maurice." His father was one of the pioneers of the trade. His usual cut is about 300,000 logs per season of pine and spruce, most of the product reaching the English market.

THOMAS MALONE.

Thomas Malone, of Three Rivers, Quebec, has been prominent for over a quarter of a century in the lumber trade of Quebec Province, though his operations have extended over a much wider field. Born in Quebec City in 1856, he began active operations, before reaching his majority, as a shipper of deals to the British market. Under his energetic management the business rapidly developed until he handled a large proportion of the output of the Ottawa Valley going to Quebec. Between the years 1876 and 1880 he operated in Michigan and Wisconsin, shipping direct to Britain. In 1884 he removed from Quebec to Three Rivers, in the neighborhood of which place he owns extensive limits in addition to conducting a lumber agency. Mr. Malone has bought and sold timber limits on a large scale, and has done much to develop the trade of Three Rivers.

THE WARREN CURTIS MILL.

At Three Rivers is also the Warren Curtis mill, which has a capacity of 100,000 feet per day of ten hours. The logs are principally spruce, and number about 200,000 per year.

ST. MAURICE LUMBER COMPANY.

One of the leading institutions of the St. Maurice River district is the St. Maurice Lumber Company, of Three Rivers. Its ownership is

largely American, and it operates the pulpwood part of its business in connection with pulp and paper mills at Glens Falls, New York. It owns extensive limits on the St. Maurice River. A large sawmill at Three Rivers produces pine and spruce deals for the English market and inch lumber for the United States, while during the working season about 100,000 feet of spruce timber is cut into pulpwood daily for shipment by the Richelieu Canal and Lake Champlain for the Glens Falls plant.

THE LAURENTIDE'S PULP MILL.

On the St. Maurice River is situated the Laurentide's pulp mill at Grand Mere, manufacturing about one hundred tons a day. Three hundred thousand spruce logs are cut yearly.

THE TOURVILLE LUMBER MILLS COMPANY.

A little higher up the St. Lawrence than Three Rivers, the river widens out and is called Lake St. Peter, near the shores of which the Tourville Lumber Mills Company has three mills—one on the north shore at Louiseville and two on the south shore at Pierreville and Nicolet. The office of the company is at Montreal.

THE CHARLEMAGNE & LAC OUAREAU COMPANY.

The limits of the Charlemagne & Lac Ouareau Company's mills are situated in the counties of Joliette, Montcalm and Berthier, in the Province of Quebec, and are composed largely of spruce, pine, birch, hemlock and ash. The output of the mill is about 30,000,000 feet, the bulk of which is shipped to Great Britain and the United States. The principal mill is located at Charlemagne, about twelve miles below Montreal, at the junction of the L'Assomption, Ottawa and St. Lawrence rivers. It is operated by steam and has a capacity of about 2,000 logs per day. The president of the company is Robert Reford, of Montreal, senior member of the firm of Robert Reford & Co.

HON. JAMES LITTLE.

The Hon. James Little, of Montreal, one of the pioneer lumbermen of Canada, died in October, 1883, being over eighty years of age, and held in the highest esteem not only in his own country but in the United States as well.

He was born near Londonderry, Ireland, emigrating to Canada in 1823, at the age of nineteen years. He passed through Montreal and went to Niagara, Ontario, then the wholesale market for that part of Canada. Toronto at that time was known as the village of York, and Hamilton was not in existence. In 1833 Mr. Little married and moved

to the township of Seneca, on the Grand River, Ontario. The place where he settled is now the town of Caledonia, which is surrounded by a country that is cleared and settled, but at the time of his first residence there the entire section was an unbroken forest wilderness, the home of the Indians.

Upon the building of the first dam in the river, Mr. Little began a lumber manufacturing business, which he carried on upon a large scale for over a quarter of a century. His operations extended over almost the entire peninsula between Lake Erie and Lake Ontario, and at one time numbered twelve different concerns. Later he operated in the counties of Brant, Wentworth, Norfolk and Elgin, and in the Georgian Bay district, Ontario, and finally in the St. Maurice River district, Quebec, after 1873 making Montreal his home. He was among the first to send lumber to the United States, Albany being his chief market.

Mr. Little was a public spirited and farseeing man, being often in advance of his fellows. This frequently caused opposition to his views, but he continued to fight for them until his object was gained. This was especially true of his labors in the interest of forestry. Seeing the rapidity with which commercial woods were being cut away with but small return to the country for their loss, and having a thorough knowledge of the subject, he became an earnest and persistent writer on the subject of forest protection at a time when the popular belief was that there was no need of any such protection. His efforts were at last rewarded. The American Forestry Congress, in recognition of his services, accorded him a vote of thanks; the first forestry association of Canada, that of Ontario, made him its honorary president, and the Government showed its recognition by establishing "Arbor Day." The United States, as well as his own country, honored James Little for his valuable work for forest protection.

Since the death of James Little his work has been successfully continued by his son, William Little, of Montreal, who seems to hold by natural heritage the same views as did his father. Following in his father's footsteps, William Little has for many years been a foremost advocate of forestry preservation, and has devoted much time and attention to the study of the relations of Canada with the United States.

J. K. WARD.

A fine type of the pioneer lumberman is J. K. Ward, of Montreal, Quebec, a Manx by birth. He migrated to the United States, and leased and operated a sawmill at Troy, New York. He bought a saw-

mill and stumpage on Maskinonge River, in Quebec in 1853, largely increasing his operations as time went by. In 1863 he located at Three Rivers, Quebec, and operated a mill, which he subsequently sold to an American concern. He then leased a larger area of timber land from the Province of Quebec on the Rouge River, and built an extensive sawmill on the Lachine Canal. He operated this mill, which had an annual cut of approximately 15,000,000 feet, until 1900, when he sold the property to a company headed by his oldest son.

THE MACLARENS.

The MacLaren family, of Buckingham, Quebec, noted for its extensive and widely scattered lumbering interests, traces its connection with the industry back to the early days of the pioneers of the Ottawa Valley. David MacLaren, a Scotchman, migrated to Canada in 1824, and took up land in the township of Torbolton, Carleton County, Ontario. He was a man of strong, energetic character and earnest religious convictions. James MacLaren, his eldest son, was six years of age when the family emigrated. On attaining the age of eighteen he engaged in lumbering, and in 1842 conducted a general store at Peche on the Gatineau River, Quebec. He subsequently built a small sawmill, and in 1853, in partnership with J. M. Currier, leased an extensive sawmill at the mouth of the Gatineau. He rapidly enlarged his enterprises and in 1864 purchased mills and timber limits on the Riviere du Lievre, Quebec. He built an immense sawmill of the modern type at Buckingham, Quebec, on the Ottawa River, at the mouth of the Lievre, about fifteen miles below Ottawa, where, for over a quarter of a century, he engaged in the manufacture of lumber on a large scale. He subsequently operated on the North Nation River, on the Upper Ottawa and in Michigan, being at one time the most extensive operator in America. He died in 1892.

David MacLaren, of Ottawa, eldest son of James MacLaren, was born in 1848. In 1874 he became manager of the Gatineau and Ottawa branches of his father's business, which at times employed over one thousand men. The business was subsequently incorporated as the James MacLaren Company, Limited, David MacLaren becoming one of the directors, a position he still holds. He is interested in many other large corporations.

Albert MacLaren, son of James MacLaren, born in 1870, is president and managing director of the company, which now operates two extensive sawmills with planing mills, etc., at Buckingham, having an output

of from 25,000,000 to 30,000,000 feet of lumber annually, and employing from 1,200 to 1,500 men in the winter and 400 during the summer months. The company has 2,600 square miles of timber limits in Quebec Province, and owns a pulp mill which began operations in 1902 and produces seventy tons of wood pulp daily.

Alexander MacLaren, another son of James MacLaren, born in 1860, has been an active participant in the affairs of the James MacLaren Company, but is, perhaps, more prominently connected with other enterprises. He is president of the North Pacific Lumber Company, Limited, organized in 1890, with mills at Barnet, British Columbia, having 90,000 acres of cedar and fir limits. Over 25,000,000 feet of sawn lumber is shipped annually from this mill, which also manufactures about 30,000,000 shingles a year. Alexander MacLaren is a director of the Keewatin Power Company, Limited, and is concerned in other industrial undertakings.

John MacLaren, son of James MacLaren, died May 29, 1903, at Kamloops, British Columbia, from injuries sustained by being thrown from a horse. As a young man he was associated with his father in the lumber business. He spent several years at New Westminster, British Columbia, and for a time lived at Windsor, Ontario. He owned a large sawmill at East Templeton, Quebec. At the time of his death he was about fifty years of age.

EZRA B. EDDY.

Ezra Butler Eddy, of Ottawa, was born near Bristol, Vermont, August 22, 1827. He engaged in the business of match manufacturing in Burlington, Vermont, in 1851, and three years later established himself at Hull, Quebec, where he erected extensive mills and workshops. He obtained large timber limits and began the manufacture of lumber, engaging also in subsidiary industries, on a large scale, availing himself of the splendid water power of the Ottawa River. In 1856 he added to his enterprise the manufacture of woodenware, and in 1892 erected a paper mill. In the meantime the business had been turned into a joint stock company under the name of The E. B. Eddy Company, of which organization Mr. Eddy is president. The establishment is one of the largest of its kind in the world, the output of the match factory being 50,000,000 matches daily. The total number of employees is over 2,000. Mr. Eddy has been mayor of Hull and represented Ottawa County for a term in the Quebec Legislature.

HON. GEORGE BRYSON.

Hon. George Bryson, who died at Fort Coulonge, January 14, 1900, was one of the pioneer lumbermen of the Province of Quebec. He was born in Paisley, Scotland, December 13, 1813, and came to Canada in 1821, when eight years of age. During the early part of his life he worked on a farm in the summer and in the winter season he got out cordwood under contract. He was one of the first to engage in lumbering in his district, and at twenty-two years of age, in company with his brother-in-law, the late Hiram Colton, of Litchfield, Pontiac County, Quebec, he began lumbering operations on the Coulonge River above Ragged Chute, Quebec. He took many rafts of square timber to Quebec, and was a well known figure in the commercial as well as the political life of Canada for more than a half century.

Mr. Bryson was a promoter of the Pontiac & Pacific Junction railway, a member of the Upper Ottawa Improvement Company for several years and was one of the founders and a director of the Bank of Ottawa. The town of Bryson, formerly known as Havelock, was renamed after the Bryson family. In politics he was a Liberal, and his parliamentary career began in 1857, when he was elected to represent Pontiac County in the old Canadian Assembly. He was called to the Legislative Council of Quebec in 1867, and occupied a seat there for twenty years, when he retired in favor of his second son, George Bryson, Junior.

EUGENE ETIENNE TACHÉ.

Eugene Etienne Taché, Deputy Minister of Lands and Forests, Province of Quebec, is the eleventh child of Sir E. P. Taché and was born at St. Thomas de Montmagny October 25, 1836. He was educated at the Seminary of Quebec and at the Upper Canada College, Toronto. He is a civil engineer and land surveyor for the Provinces of Quebec and Ontario. In 1862 he received the brevet of captain in the Chasseurs Canadiens, of Quebec. He was also a member for several years of the Civil Service Rifle Corps, at Ottawa. On September 20, 1869, Mr. Taché was appointed Deputy Minister of Crown Lands, for the Province of Quebec. The department has been known for several years past as that of Lands, Forests and Fisheries, but quite recently it has assumed the title of Lands and Forests simply, the other branch having been added to another department of the government service.

As a land surveyor Mr. Taché has had wide experience, among other important works, having been engaged in the location of the

Ottawa Canal. The maps of the Province which have been drawn by him are models of exactitude and clearness. The plans of the legislative buildings and the courthouse, as well as other notable civic and military edifices in the City of Quebec, were made by him, and in these he has shown great taste and originality.

Mr. Taché has given loyal and active service to the Province for thirty-six years. He has worked conscientiously and assiduously and has shown himself to be a thorough master of all the intricate details of the most important department of the government service. He is the author of the beautiful and patriotic device, "Je me souviens," which accompanies the arms of the Province of Quebec. His Majesty, King Edward, recognizing the official merit of Mr. Taché, has created him a Companion of the Imperial Service Order.

He has been married twice—on the first occasion to Olympe Eleonore, daughter of Louis Albert Bender, who died in 1878; and subsequently to Maria Clara, daughter of the Hon. E. L. A. C. J. Duchesnay.

CHAPTER XII.

ONTARIO—EARLY HISTORY.

As the early history of the Ontario lumber trade goes back to the time when this great section of Canada formed a part of Quebec, any time selected for its beginning, save that time when the pioneers of New France began to sell timber to their neighbors, must be purely arbitrary. This is true for two other reasons also: First, because the great avenue of the lumber trade, the Ottawa River, is the boundary line between the two Provinces; and, second, because Upper and Lower Canada, after being separated in 1791, were again united under one legislature from 1840-1 to 1867. While the public records were in a measure kept separate they operated under the same laws, while the capital city changed every four years from Toronto to the fortress of Quebec. Some things which equally affected the trade in Ontario have been described in dealing with Quebec and are only touched on here, while other things, which it has been deemed advisable to treat in connection with this Province, were matters of momentous importance to the lumbermen of Quebec. However, for the purpose of this description of the lumber trade, Ontario history may be considered to begin with the setting apart of Upper Canada as a separate province in 1791. This was the period when the only persons authorized to cut timber in the King's forests in Canada were the contractors for the royal navy, who, under their licenses, managed to cut a good deal for the general market without returning any revenue to the Crown. As a part of Quebec, Ontario had part and lot in the regulations regarding the running of the rapids in the St. Lawrence and the preferential duties granted by Great Britain.

The lumber industry was one of the first mechanical activities established in Ontario, and dates back to the early days of the settlement of the country shortly after the American Revolution. At that time the entire country now embraced within the limits of the Province was densely wooded. In the southern portion, where the first settlements were made, the hardwood varieties predominated, largely interspersed in some localities with the white pine and other coniferous trees. In the more northerly sections, however, and especially in the

Ottawa Valley, the pine, hitherto the main factor in the forest wealth of Canada, and its kindred species grew in profusion and at an early date became a valuable and much appreciated source of revenue to the pioneers, who depended largely on the means realized from the timber export trade to procure the supplies they required.

Incidental to the work of clearing the land, the settlers in many localities where small sawmills were established were enabled to procure supplies of lumber for local consumption, but the Ottawa Valley, with the means of transportation furnished by the Ottawa and St. Lawrence rivers, early attained that preëminence as a source of the export trade on a large scale which it has since maintained.

In treating of this phase of the subject it is difficult to confine this account strictly to the trade of Ontario, as the industry in the early days developed simultaneously upon both sides of the river, some of the largest mills drawing their supplies from Ontario being located on the Quebec side.

The watershed of the Ottawa embraces a region of about 80,000 square miles, much of it good agricultural land, and producing originally some of the finest pine timber in the world. Two hundred and fifty miles to the northwest of the City of Ottawa the river expands into a long and narrow sheet of water known as Lake Temiscamingue, which presents sixty miles of unbroken navigation and receives numerous important tributaries—including the Blanche, the Montreal and the Quinze rivers. Navigation on the Ottawa is interrupted by numerous rapids and falls, the most notable being the grand falls of the Chaudiere, immediately above Ottawa City, which furnish the power for many extensive mills and factories. The territory drained by the numerous tributaries of the Ottawa before its confluence with the St. Lawrence includes some of the richest and most valuable timber yet remaining unexploited.

THE PIONEER OF THE OTTAWA VALLEY.

The pioneer in the timber trade of the Ottawa Valley was Philemon Wright, an adventurous American, whose descendants have occupied prominent positions in the Ottawa district. Mr. Wright was a citizen of Woburn, Massachusetts, and the first man to appreciate the natural wealth and advantages of the Ottawa Valley as a field for colonization. His first visit was made in 1796. In the following year he returned and, in the face of many hardships and difficulties, explored the country on both sides of the river as far as the Chaudiere Falls. He was

particularly impressed with the value of the timber ("sufficient," as he afterward reported, "to load a thousand vessels") and with the possibilities of the Chaudiere Falls, or the Asticou, as the Indians called them. This cataract, or Chaudiere (caldron) as the French-Canadian lumbermen christened it, is situated at the place where the mighty Ottawa, contracted from the width of over a mile to a few hundred feet, pours itself over rocks thirty feet high, into a boiling, steaming pot with force sufficient to drive all the busy wheels of a great modern city. This fall represents the point where, for four hundred miles in the course of the Ottawa, the shores of the Provinces of Ontario and Quebec approach most nearly to each other.

Mr. Wright left Woburn February 2, 1800, with five families, and had in his train fourteen horses, eight oxen and seven sleighs. His destination was what was then a wilderness inhabited by a few Indians only. He settled opposite the present City of Ottawa, having obtained an extensive grant of land from the Government. Mr. Wright, like the patriarch, had the whole land before him and could choose either the right hand or the left. He chose the Quebec side and founded the city of Hull, doubtless without dreaming that on the high, rocky cliff on the other shore would within a century be seen the Gothic spires and turrets of the "Washington of the North," the capital of a country stretching from the Atlantic to the Pacific. The first tree was felled on the site of his homestead March 7 of the same year.

In 1807 Mr. Wright took the first raft of square timber down the Ottawa to Quebec. The few settlers declared such an undertaking to be impossible on account of the obstructions in the river, but Mr. Wright was determined to make the attempt and, in the face of gigantic difficulties, accomplished the trip. It required thirty-six days, as the venturesome pioneer and his assistants were unacquainted with the river and had to proceed with great caution. He continued, during subsequent years, floating to Quebec white oak and the finest qualities of pine. The squared oak was withed up by the ends with lighter material to keep it afloat, or loaded on white pine cribs. It took both time and patience to get acquainted with the dangerous parts of the river and, until improvements were made, many cases of drowning occurred.

He built his first sawmill and grist mill in 1808. These were burned and were rebuilt with his characteristic pluck in sixty days. Square timber was hastened to market as rapidly as possible, the mills being

rebuilt with the proceeds. The business grew and flourished and Mr. Wright eventually derived a large income from it. He built the first timber "slide," on the Hull side of the river, in 1829. Mr. Wright was elected the first member of the Canadian Parliament to represent Ottawa in 1830. He died in 1839, and his name has been perpetuated in Wright County, Quebec. His son, Alonzo Wright, was for many years a striking figure in the Canadian Parliament, in and out of which he was known, from the tributary of the Ottawa which his family and himself had done so much to develop, as "The King of the Gatineau."

The City of Ottawa, the present center of the lumber business, remained in a state of nature for some time after Philemon Wright had formed the nucleus of a settlement on the opposite shore of the river. In 1826 it was covered with bush and had only one house on the present site of the Upper Town. The first impetus to settlement was given by the construction of the Rideau Canal, projected mainly as a military work, under the superintendence of Colonel By. This work was completed in 1831, and in the succeeding year the village of Bytown, as it was then named in honor of Colonel By, had about one hundred and fifty houses. Thereafter it grew rapidly and Hull became practically a suburb.

Meanwhile lumbering operations had been extensively pushed in the district and manufacturing developed to a greater extent than elsewhere in the Province. About 1815 a Mr. Story built a sawmill on the Ottawa; and it is stated that when the man in charge "gigged" back the carriage for a fresh cut he would sit down on the log and eat his dinner, which would be about finished when the cut was done. It is no wonder that heart failure and nervous prostration were then unknown. Robert Gourley, prominent as an author and a political agitator, in his "Statistical Account of Upper Canada," published in 1818, mentions that sawmills of the best construction were in operation on an island in the Ottawa River opposite the higher part of Hawkesbury Township, on a scale superior to that of any other in the Province. "The business seemed to be carried on with great spirit, about fourscore people being employed in the works on the island." They were first owned by Mr. Mears, of Hawkesbury, but, at the time he wrote, they were the property of Mr. Hamilton, from Ireland.

Statistics compiled from the assessment rolls of the Province of Upper Canada give nine sawmills as the number existing in the Ottawa district in 1823, the total number in the eleven districts into which the

Province was then divided being 363. The great majority of these, however, were run merely to supply local requirements.

The town of Pembroke, about one hundred and twenty miles up the river from Ottawa, was founded in 1828 by Colonel Peter White, a native of Edinburgh, Scotland, who was for many years one of the principal timber merchants of the Ottawa Valley. His sons have been actively engaged in the lumber business, and by their enterprise have done much to build up their native town.

The town of Deseronto, on the Bay of Quinté, near the eastern end of Lake Ontario, was founded by Hugo B. Rathbun, of Auburn, New York. In 1854 Mr. Rathbun engaged in the manufacture of lumber at Mill Point, now Deseronto, Ontario. Later his son, Edward Wilkes Rathbun, was taken into partnership and was given the complete charge of the Deseronto business. About 1868 the Rathbun lumber yards were established at Oswego, New York, and sawmills were built later at Gravenhurst, Lindsay, Campbellford, Fenelon Falls, Tweed, Manitoulin Island and Bancroft. The Rathbuns owned two railroads, one from Deseronto to Tweed, a distance of thirty miles, and another connecting Gananoque with the Grand Trunk railroad. They also owned a line of steamers operating on the Bay of Quinté. They manufactured one million railroad ties a year and also owned the cement works near Napanee, gas works, sash and blind factories, match splint factory, chemical works, ship yards, locomotive works and car shops. The firm also operated four lumber yards in Canada and the United States. Edward Wilkes Rathbun died in November, 1903, and was succeeded by his son, E. W. Rathbun.

Henry Franklin Bronson of Bolton, New York, came to Ottawa (then Bytown) in 1853 and built on Victoria Island, in the Ottawa River, the first sawmill which shipped lumber from the Ottawa River to the American market. The venture prospered and grew, and many fortunes were made in the trade.

THE FIRST PAPER MILL IN ONTARIO.

V. H. Hickox, of Niagara Falls, tells of the first paper mill in Ontario. He says:

It was in the summer of 1841 that my father and another paper maker, whose name was Samuel Prine, engaged to go to Toronto and start the first paper mill in Upper Canada. They left Niagara Falls in June of that year. This mill was located about three miles from the city, up the River Don, a beautiful clear stream of water, well supplied with trout and other kinds of fish in abundance. The country round about was a vast wilderness of heavy timber, mostly pine, with here and there a little clearing with log cabin homes of the early pioneers.

Eastwood and Skinner, brothers-in-law, two enterprising Englishmen, built the first mill and received a cash premium from the Canadian government. In connection with the paper mill there was a grist mill, a brewery and distillery, owned by the Helliwell Brothers. The place was named Don Mills.

My father made a sojourn of seven years, during which time he started a second paper mill on the Don River, two miles above the first mill. We moved to Hamburg, west of Buffalo, about 1848. In the year 1851, Albert H. Porter sold the paper mill on Bath Island and my father, by this change, secured his old position as superintendent of the upper Don paper mills. Then he moved back to Toronto in 1851, where he remained for many years, respected as the man who made the first sheet of paper in the Upper Province of Canada.

CROWN TIMBER REGULATIONS.

During the earlier years of the lumber industry there were practically no restrictions on the cutting of timber upon the public domain and no thought on the part of the Government of deriving a revenue from the forest resources. When the British took possession of the country in 1763 elaborate instructions were furnished to Governor James Murray as to his administration. The British government was solicitous for the preservation of large areas of forest land as a source of supply of timber for naval construction, and the Governor was ordered to set aside in every township "proper quantities of land" for fortifications, barracks and other military or naval services, and more particularly for the growth and production of naval timber, "if there are any woodlands fit for that purpose."

The policy which the British government laid down for the formation of Crown timber reserves in Quebec for the preservation of timber for the royal navy was reaffirmed when Upper Canada was set apart as a separate province. The Duke of Richmond, governor-in-chief of the Province of Upper Canada, in 1818 received elaborate instructions that no land should be allotted to settlers until the district had been surveyed and those parts containing masting or other timber fit for the use of the royal navy reserved. Difficulties intervened and these regulations, wise in many respects, were never carried out.

These instructions, though subsequently repeated, were never observed, possibly because the governors had many more urgent matters to engage their attention and no doubt regarded the reservation of forests as altogether superfluous in a country where the timber, until a much later period, seemed inexhaustible.

It was not until 1826 that the earliest steps were taken to secure revenue from the forests on the Crown lands. Previous to this the only persons authorized to cut timber on the public lands were the con-

tractors for the royal navy or those holding licenses for them. In the early years of the Nineteenth Century licenses to cut timber in the Canadian forests were granted by the Imperial government to contractors for the royal dock yards, who, in addition to filling their contracts, took advantage of the privilege granted them for that purpose to do a general business in supplying the British markets. Their mode of operation was to issue licenses to merchants and lumbermen in Canada who were then legally authorized to cut timber as their agents. While these favored firms had a legal monopoly of cutting timber on the public lands, for which they paid nothing to the revenue, a number of unlicensed lumbermen pursued the business actively without asking the leave of anyone. It was found impossible to suppress this practice so long as those who desired to engage in the industry were debarred from doing so in a legitimate manner. The unfairness of the system led to its abolition.

ESTABLISHMENT OF TIMBER DUES SYSTEM.

In 1826 the contractors' monopoly was abrogated and for the first time was inaugurated a system under which the cutting of timber on the ungranted lands of the Ottawa region was extended to anyone desiring to embark in the business, on payment of a fixed scale of rates. This was announced May 3, 1826, by a proclamation of Sir Peregrine Maitland, lieutenant governor of Upper Canada. The dues fixed in this proclamation were: Upon oak timber £6 5s a thousand, or 1½d a foot; red pine £4 3s 4d a thousand, or 1d a foot; yellow (white) pine, £2 1s 8d a thousand, or ½d a foot; sawed, 2d a log; staves, £4 1s 8d a thousand "to be paid in lawful money of our Province of Upper Canada." For the purpose of preventing too small timbers being cut, double the amount of duty was charged upon all which did not square more than eight inches. The money was Canadian currency, one pound sterling of which was equal to \$4.

In the case of some of the mills in operation at this early date in the Ottawa Valley, much of the supply apparently came from lands which had been granted by the Crown, for the exploitation of which no license was necessary. Philemon Wright, for instance, is stated to have obtained land grants amounting to 13,000 acres.

The first collector of timber dues on the Ottawa River was Robert Shireff, a pioneer lumberman whose son, Charles Shireff, acted conjointly with him without receiving any formal appointment. The system was modified somewhat in 1827 when Peter Robinson was

appointed surveyor general of woods and forests for Upper Canada. It was provided that licenses to cut specified quantities of the various kinds of merchantable timber off a given territory were to be sold by auction, with upset prices fixed at considerably less than the previously adopted scale. The expenses of the surveyor general's office were very modest. He was allowed £25 per annum for office rent, a like sum for a messenger, and £10 for fuel. Pay of clerks and assistants "as may be necessary and as the governor may deem reasonable" was allowed, but with a special proviso that the whole of such expenses was not to exceed one-sixth of the revenue derived from licenses.

Robinson was instructed to survey the forests in the Province and state what parts it was advisable to keep for the use of the King and what might be sold. The generous instructions showed how little idea the British government had of the size of a province over 260,000 square miles in area, or only about 5,000 square miles less than the great State of Texas, and which, after three-quarters of a century of development, still has large areas unexplored and which will probably not be surveyed until a century from the time Peter Robinson started out. Such timber as was not required for the navy and which was deemed expedient to cut was to be put up for sale after due notice in the *York (Toronto) Gazette*. Each license was not to exceed 2,000 cubic feet and the upset prices were, per thousand feet: Oak, £3 3s 4d; ash, elm or beech, £2 10s; red pine, £3; white pine, £1 10s; staves, and handspikes, £1. The timber was to be cut within nine months and paid for within fifteen months from date of license. Measurers were appointed in each district to certify to the amount of lumber cut.

The attempt to regulate the price of licenses by competition was not at that time successful as, owing to the laxity of administration which then prevailed and the recklessness with which the public lands were granted in large areas to men of influence and to political favorites, lumbermen found it considerably more profitable to obtain the fee simple of timbered land, either directly from the Government or by purchase from the first holders of the title, than to pay timber dues. Hence the receipts for some years were small. In 1827 the first returns from timber licenses in Upper Canada were received, the amount being \$360. The following year the revenue from this source was \$3,134, and in 1829, \$2,287.

It may be noted incidentally that about this time Canadians began to reckon in dollars and cents, instead of in pounds, shillings and pence,

though for some time thereafter both systems were used. In fact, there are old farmers in the back townships who to this day calculate in "York shillings."

CONDITIONS PRECEDENT TO THE REBELLION OF 1837.

The loose and careless business methods characteristic of the system of collecting timber dues, as well as other branches of administration in the years preceding Mackenzie's Rebellion, resulted in a loss of many thousands of pounds to the revenue owing to business complications in which the Shireffs became involved. When, under Lord Durham's administration in 1838, after the suppression of the rebellion, an exhaustive investigation was made into the abuses which provoked it, it was officially stated that the gross amount received by the Province of Upper Canada for timber dues, from the establishment of the system up to January 30, 1838, a period of about ten and a half years, was £58,085 4s 11d.

Under the system in vogue at this period the licenses designated the quantity to be cut and the applicant was required to deposit in advance 25 percent of the amount of dues called for by the regulations on that quantity. A frequent practice, however, was to exceed greatly the cut stipulated for, as in this way the cash deposit required was proportionately reduced. A bond was given to cover the balance of the estimated dues.

A license granted to James Wadsworth, of Hull, in 1836 gave him the right to cut 40,000 feet of red pine timber on the south side of the Bonnechere River on the following terms: "Sum payable for this license £41 13s 4d currency, being 25 percent on £166 13s 4d, the value of 40,000 feet at 1d. For the balance of £125, a bond has been granted payable 1st November, 1837."

The descriptions of the limits in these old licenses were often rather vague and indefinite. That in the above mentioned document reads as follows: "The limits granted in the foregoing license are Butted and Bounded as follows, viz.: Commencing one Mile below Enoes' or the Indian Doctor's Landing and to extend up on the south side of the river ten miles more or less to its source or so far as it is capable of floating down timber and to run back five miles, more or less, half way to the waters of the Madawaska River on the course south 21 degrees west."

Another license granted to John Supple, of Hull, in 1838 permits him to cut 25,000 cubic feet of red pine on the north side of the Inlet

of Lake Dore, the rate and terms of payment being the same as in the previous case. His limits were described as "Commencing at the head of Lake Dore to extend three miles up the inlet of the said Lake to be measured on the course S. 82 degrees W. and to run back four miles more or less to the limits granted on Indian River on the course North 8 degrees W."

It is not surprising that, owing to the want of precision in the definition of limits, disputes often arose between limit holders. These difficulties often resulted in resort to physical force, in which the operator who happened to have the largest number of men on the ground generally came off triumphant. In fact, the frequency with which this rough-and-ready means for the settlement of controversies between rival lumbermen was resorted to became one of the causes of overproduction, as the limit holders, finding it advisable to have a large force of men on the spot should it become necessary, in diplomatic phrase, to "rectify their frontiers" and prevent their neighbors from construing the "more or less" qualifications in their licenses too liberally, increased the output considerably beyond the requirements of the market.

It may be noted that until the union of the Provinces of Upper and Lower Canada in 1840, the disposal of timber, as well as of lands and other natural resources, was entirely in the hands of the Crown, that is to say, the administration of the day, without any responsibility to the legislature as to the expenditure of the revenue derived from them. The manner in which this privilege was abused for the benefit of the official classes and their friends was one of the grievances which caused the outbreak in 1837. The plan which was actually adopted and the system which grew up was for lumbermen to apply in the autumn for a license stating the quantity that they wanted to cut and paying 25 percent of the dues in advance. As they were not required to confine themselves strictly to the quantity specified they advanced as little money as possible. The timber was cut the next winter and rafted to Quebec City, to which point the collector proceeded and received the dues. In fact, the practice grew up of taking the notes of Quebec lumber shippers instead of the bonds originally given by the lumbermen, so that the timber was across the ocean and sold in London before the dues were actually paid. For many years this worked no harm; but later, when bad seasons came and several firms failed, the revenue suffered a loss of several thousand pounds.

This free and easy handling of revenues and treatment of instruc-

tions from Westminster was not the worst thing about the administration of this period. Great Britain had lost half the continent and was not inclined to lose the other half in the same way; but London was a long way from Quebec and Toronto, and the officials who came out to administer the affairs of the country were disposed to make hay while the sun shone and trust to the distance preventing the news filtering back to London. The people in the colony of Massachusetts rebelled because taxes were imposed without their consent; but the English settlers in Ontario and the French-Canadians in Quebec took up arms in 1837 because their great natural resources were alienated and given to friends and favorites with a lavish hand. The governor and the majority of his counsel were appointed; and, by methods familiar to all politicians in all ages, they practically secured all the jobs for their relatives and retainers. The administration was known, both in Lower and Upper Canada, as the "Family Compact," which had become a synonym for jobbery and corruption.

MACKENZIE REBELLION AND ITS RESULTS.

In Canada, or any other colony, the difficulty would be speedily gotten rid of today by the legislature refusing to vote supplies, and the administration unable to carry on the government or pay its officials, would resign; but in 1837 the revenue which the administration received was sufficient to pay the running expenses of the government. There was a rebellion in both Upper and Lower Canada, in which all the nationalities represented in Canada joined. In Lower Canada it was led by a French-Canadian, Papineau, with English and Irish lieutenants; while in Upper Canada it was led by an irrepressible Scotchman, William Lyon Mackenzie. The United Empire Loyalists, who had left their fat farms and prosperous businesses in the United States rather than exchange King George for George Washington, were among those who most keenly opposed the Family Compact, and many took up arms, not against the King, but against corrupt ministers who thwarted his will.

The rebels had a good cause, but the fates were against them. They rose on December 4, 1837, and trusted to gain possession of York (Toronto), and also of the Quebec centers of population, before the loyalists could be supported by reinforcements from the garrisons in Lower Canada. But, owing to one of the most remarkably open winters on record, ships were able to navigate Lake Ontario and the St. Lawrence in midwinter and the rebels were crushed, beaten, the leaders forced to flee to the United States, and some who were caught were hanged by the victorious Family Compact.

It is said that success is the only justification for rebellion; but this rebellion was justified, though abortive, and the leaders returned from the United States and from their hiding places in the back woods to be elected to the highest positions within the gift of their countrymen. The reason for this was that the attention of the British government was called to the fact that the state of things in the colony was so desperate and so unjust that men were willing to risk their lives to wipe it out. Lord Durham was sent out to inquire into the whole matter, and as a result of that inquiry he released the prisoners still lying in the jails when he arrived, removed the governors, recalled the fugitives and forever put an end to the Family Compact by giving the people full, responsible local government.

The report of Lord Durham shows that the main abuse from which the country suffered was the granting of wild lands in large tracts to persons who had no intention of improving them, but of simply holding them for a rise in value.

The effect of this practice upon the lumber trade was important. Much of this land, granted so far in excess of actual needs of settlement, was covered with valuable timber, and lumbermen speedily saw that it was cheaper to get hold of the land with all that was on it than to pay the prices charged for the timber licenses. This encouraged improved methods of lumbering. The repeated instructions of the Imperial government to set aside permanent timber reserves and to confine settlement to lands adopted to agriculture were unregarded, and much of the area granted was capable of producing nothing but timber to advantage. Lands could be bought for from 1 to 4 shillings an acre, while the timber dues on an average tract were 6s 8d an acre. Prominent men in the government of Canada urged that, as there was now but little pine left in the United States except in Maine and Carolina, prices should be higher for timber berths in Canada; and they gave as a reason why they were not the presence of the large areas of wild lands open to purchase.

The deputy postmaster general of British North America, T. A. Stayner, in giving evidence before a commission said that in 1835 and 1836 speculators came over from Maine and New York and purchased about a million acres of land said to be wooded with pine or spruce. The Americans estimated these lands as worth from \$2 to \$6 an acre. Charles Shireff, who has been previously spoken of as the collector of dues at Ottawa, mentions a party of Americans who purchased thou-

sands of acres in the township of Onslow for ten shillings an acre, which price could not bear any proportion to the value of the timber. Many similar cases had occurred, he told the investigating committee, and the temptation to do it was very great because the purchasers were not required to pay the full amount of the purchase price, but only a first installment of varying size, say a fifth or a fourth, and the only penalty for the nonpayment of the remaining installment was the resumption of the land, about which, since the lumberman had stripped off the timber, he was naturally very indifferent.

Mr. Shireff urged that the Government should not sell lands unfit for settlement but merely the timber on them. Though this warning was stated and reiterated by every one interested in the permanent development of the lumber industry, it was many years before it was acted upon. It was acted upon at length, however, and now in Ontario the question is not as to the principle but as to how large a block of arable land in a forest belt should be to make it worth while for the Government to throw it open for settlement.

According to an official statement made at the investigation just referred to, the timber dues collected for a period of ten and a half years, from 1827 to 1838, amounted to £58,085 4s 11d; this was exclusive of losses through loose methods of collecting dues and defalcation of upward of £9,000.

UNION OF 1841 AND NEW TIMBER REGULATIONS.

The result of the rebellion and all these commissions and reports was the union in 1841 of Upper and Lower Canada with a government responsible to the people through their elected representatives.

One of the first things which the new legislature took up was the administration of the timber lands. The collector at Bytown (Ottawa) was instructed to issue licenses in the usual form, but for a limited period, to relicense limits not properly worked and, where there were two or more applicants for the same berth, to put it up at auction for a bonus over the dues. The quantity of timber which the licensees were bound to take out was 5,000 feet a mile of river front and no limit was to exceed ten miles of frontage. This was the first time that the auction principle, now generally adopted, was recognized in Canada.

The receipts from timber in Upper Canada for the year 1839 were £8,244; and for the next thirteen months £18,881, a difference possibly due to the "house cleaning" before turning affairs over to the new government. Under the new regime the timber receipts for Upper and Lower Canada were in 1842, £37,572; in 1843, £46,301; in 1844, £28,828.

The representatives of the people did not seem to recognize the necessity of preserving timber. Most of them appeared to think the tree their enemy, and the impression that the forest area was unlimited rendered them careless. The idea of reforestry and harvesting a periodic crop was not then born in America. A motion to discuss a resolution to prevent the cutting of timber (apparently absolutely) off public lands received short shrift in 1846, but its exact nature and object can not be learned from the journals.

In 1842 new regulations as to the granting of licenses were adopted and the principle of competition between lumbermen in cases where there was more than one applicant for the same limit was put into effect. Willful trespass by limit holders upon public property not included in their limits, which had been frequent under the former conditions, was declared punishable by the cancellation of the license and the seizure of timber so taken, and limit holders were obliged to cut 5,000 feet per square mile off their holdings in each year.

In the earlier days of the export trade with Britain the shippers had to encounter a strong prejudice on the part of the consumer against Canadian pine, which was erroneously supposed to be particularly subject to dry rot and altogether of a quality inferior to that of the Baltic pine. The cause of this prejudice and the change of opinion that finally came about are fully treated in the first chapter on Quebec and, therefore, need not be repeated here.

Another noticeable change in the demand of the British market which occurred somewhat later was the increased appreciation of white pine as compared with red. Red pine, by reason of its similarity to the product of the forests of northern Europe, ever since the introduction of Canadian timber had been more highly esteemed. At an early day the dues on red pine had been fixed at one penny a foot, while white pine paid only one-half penny. So marked was the falling off in the British demand for the former that in 1852 the corporations of Bytown and the municipal council of Carleton County petitioned the Government for the reduction of the red pine duties to the same amount as those payable on white pine. Such valid reasons were advanced in favor of the change that the Government decided to make the reduction.

The year 1845 was an exceedingly prosperous one for the lumber trade, owing largely to the heavy demand in the English market at very remunerative prices. The temporarily favorable conditions resulted in considerable overproduction, which, coupled with a falling off in re-

quirements abroad during 1846 and succeeding years, created a serious depression in the industry. The regulations of the Crown lands department had contributed not a little to stimulate production to an undue degree by requiring the taking out of a large quantity of timber on every limit, regardless of the requirements of the market or the convenience of the operator, under penalty of forfeiture of the limit.

More stringent regulations were adopted in 1846, when the limit was reduced to five miles in length along the river by five in depth, or half way to the next river. The then holders of licenses were allowed to hold them for two years longer, but after that time the limits must be subdivided to these sizes. New and renewed berths were to be put up at auction. The parties were to bind themselves to take out 1,000 feet a square mile a year and were to pay one-fourth of the dues upon this forthwith and bonds were to be given for the remaining three-fourths.

In 1849 the Legislative Assembly appointed a select committee to inquire into and report on the state of the lumber trade, the evidence taken before which indicated some important features of the license system in which reform was necessary. The committee reported that the regulation requiring the cutting of a certain amount of timber on each limit, together with the uncertain tenure of limits, tended to cause overproduction. They recommended the abolition of the deposit system and the substitution of ground rents.

FIRST CANADIAN TIMBER LICENSE LEGISLATION.

The immediate outcome was the adoption during the same year of the first Canadian legislative enactment on the subject of timber licenses, which, with the regulations issued in accordance with its provisions, practically forms the point of departure from which the present system has been evolved. The characteristic and valuable feature of this legislation was that, by practically giving the license holder a preferential claim to renewal of his license so long as he complied with its conditions, and securing him against encroachment by rivals, it imparted greater stability and permanence to the industry and lessened the temptation to reckless overproduction and wasteful methods.

The modern lumbering system as contrasted with the old fashioned method of conducting the industry may be said to have commenced during the '50's and its development was aided by the changes in the law and regulations above noted and by further advances in the same direction introduced in 1851. In that year ground rent on limits was

imposed, the principle being generally favored by practical lumbermen as the most effective means of preventing the monopolization of unworked limits. The ground rent was fixed at fifty cents a square mile in addition to the dues and it was provided that this should be doubled for every year during which the limits remained unworked. While the general principle of granting limits to the first applicant, giving the preference to the previous occupant in case he had complied with the regulations, was left undisturbed, a modification was introduced by the provision that upon rivers where the cost of surveys rendered it advisable, limits might be disposed of at an upset price fixed by the Government, and awarded to the highest bidder in case of competition, an important move in the direction of the auction system as it now exists. All sawlogs cut for exportation were made liable to double rates of duty. This latter clause was the result of an agitation which had sprung up even at that early day against the shipment abroad of logs in an unmanufactured state.

During the continuance of the union, Ontario participated in the same laws and regulations as Quebec. These gradually grew more stringent during the first ten years and in 1851 had reached the beginning of the system at present in use in both Provinces.

AN INQUIRY AS TO TIMBER REGULATIONS.

In 1854 a committee was appointed to review the whole question of timber regulations. One of the snags which it endeavored to uproot was the cutting of timber by bogus settlers. The settler was required to pay down only one-tenth of the purchase price, and these bogus settlers, after having cut and sold the merchantable timber refused to pay the other nine installments. One solution offered was that the land should be sold only for cash, while another was that timber dues should be applied to the purchase of the land. This plan was open to serious objections in that the price of the land was not equal to the dues, and the squatter or settler it was desirable to get at, was never, at the critical time, where the Government could put its finger on him.

The adoption of reciprocity between the United States and Canada in 1854, which secured free exchange in natural products, including lumber, gave an impetus to the sawn lumber trade, and the trade in square timber declined. This condition was discussed by the committee of 1854, and led leading men to urge the Government to speed the parting guest by reducing the dues on sawn lumber as compared with hewn. They did this on the ground that square timber caused a great

waste, only the best sticks being used and only a portion of them. Large parts of the tree that could be worked up in taking out sawlogs were left to decay in the bush and to increase the danger of forest fires. It was estimated that three-fourths more of the tree was used for sawlogs than for square timber, and returns to the Government (owing to the greater number of feet produced) would be three times as much in the former case as in the latter. No difference appears to have been made and the square timber trade declined through natural causes.

The difference between the Canadian and the United States methods of holding land was dealt with by the committee. The exposition of American methods before the committee went to convince it that, whatever the fault in Canadian methods of handling timber lands, they were to be preferred to those in vogue in the United States. The gentleman who explained to the committee the American system was Jonathan R. White, of Michigan. He said the United States wild forest lands were thrown open by proclamation and sold to the highest bidder at an upset price of \$1.25 an acre. Lands not sold were open for sale at the upset price, and there was no limit to the amount any man could hold. Mr. White thought the system a very good one, getting the land rapidly under taxation and saving the timber, which under stumpage system was always more or less wasted. The fact that the land was of little value agriculturally was all the more reason for getting rid of it. The Canadian witnesses took issue with Mr. White, claiming the result of the introduction of that system into Canada would be to place the best timber lands in the hands of capitalists or companies who would exact toll on those who went in actually to work the land or cut the timber. The dues on two trees of very ordinary size, seventy-five feet, at $\frac{1}{2}$ d a foot, would amount to \$1.50, or more than the price of \$1.25 an acre at which the land was sold in the United States. But an acre of well timbered land produced five times that amount of dues. This was considering the pine only, and the other woods and the land would still remain to the Government and these would always be worth something.

The wisdom of the Canadian view has been proved, because it keeps the unarable lands in the hands of the Government to license and relicense at ever increasing prices to the lumbermen, and to be reforested without let or hindrance, now that the country and trade is reaching the stage where this method is practicable. Even at the time of the committee of 1854 the idea of an annual crop of timber from a permanent forest was put forward. Fire prevention was discussed also and the

lumbermen held then as they do today that the best way to prevent fires was to prevent squatting in forests, and to confine settlements wholly to agricultural. It was pointed out that scattered settlement on odd bits of land in the midst of pine forests was of no permanent value to the settlers, and by reason of starting fires was ruinous to the lumbermen. Attention was also called to the fact that in Ontario the arable and pine land lay in belts in such relation to each other that the development of timber provided a good market for the farmers and thus helped the development of the agricultural portions.

The regulations of 1855 chiefly affirmed the right of the Government to make any changes it desired in ground rent and the conditions of license, in other words, the license conveyed no vested rights. The growing nature of the industry is shown in receipts for ground rents, timber dues and slide dues. These were: 1856, \$262,872; 1857, \$289,839; 1858, \$232,624; 1859, \$316,656. In the regulations of 1860 further steps were taken to stop the squatters, the most effective being a plan of survey to determine what districts should be thrown open to settlement. To prevent the shipping of lumber cut by trespassers on Crown lands to the United States, all vessels previous to obtaining a clearance were obliged to furnish the collector of customs with evidence that the dues had been paid. It was pointed out that the industry was one of the most important in the country. In seven years, ended December 31, 1863, the exports from Upper and Lower Canada amounted to \$73,004,312, while the value of agricultural products exported in those years amounted to only \$49,951,961. March 17, 1866, the reciprocity treaty with the United States expired and on June 27 Canada put export duties on sawlogs and shingle bolts of \$1 a thousand and \$1 a cord.

CHAPTER XIII.

ONTARIO AND THE UNITED STATES.

The great expansion which characterized the Ontario lumber trade beginning about the middle of the Nineteenth Century was due mainly to the increasing demands of the United States for Canadian lumber. Active lumbering operations were still being carried on in the central and eastern states, and the industry was just beginning in the Saginaw Valley and other points in the West. The adoption of the reciprocity treaty in 1854, securing the free exchange of natural products between the United States and Canada, including "timber and lumber of all kinds, round, hewed and sawed, manufactured in whole or in part," stimulated considerably the growing demand for the forest products of Canada.

In proportion as the market for sawn lumber developed, the cutting of square timber, long the leading branch of the industry, declined in importance and became less essential to the prosperity of the lumbering interest. From being the principal factor in the export trade it speedily fell to a subordinate position, as its disadvantages, especially in the matter of its wastefulness and the greater danger of forest fires from the amount of litter its prosecution left in the woods, began to attract attention. The extension of the market and the rapidly changing conditions of the trade were attended by some fluctuations and vicissitudes, and inflations and depressions naturally followed because of the abundance of the supply of raw material available. The price of waney and square white pine would sometimes fall in the Quebec market as low as ten cents a cubic foot and suddenly rise to twenty-five cents, and the variations of the Albany market, then an important center of the trade were extensive, and imparted a speculative character to the business.

The American Civil War, and the lavish expenditures which resulted, created a great demand for Canadian lumber at high prices, though the trade received a setback in 1866 by the abrogation of the reciprocity treaty. This led to the reimposition by Ontario of export duties on unmanufactured logs.

A few figures may be given to show the altered character of the trade during the decade immediately preceding this event, and the

growing importance to Canadian lumbermen of the American, as compared with the British, market.

The total exports of forest products from Old Canada (the present Provinces of Ontario and Quebec) to Great Britain for the three-year period 1854-6, at about the time of the adoption of the reciprocity treaty, amounted in value to \$18,288,702, while the aggregate shipments to the United States were valued at \$8,894,218. The total shipments of lumber and timber for the fiscal year 1867 amounted to \$13,948,648. The proportions consigned to Great Britain and the United States were nearly equal, being valued at \$6,889,783 and \$6,831,252 respectively. The increase in the American export trade was almost entirely in sawn lumber. While "planks and boards" were exported to the United States in 1854 to the value of \$1,866,712, the same item figures in the returns for 1867 to the amount of \$5,043,367. The development of this feature of the trade, while to a certain extent fostered by the favorable conditions of the reciprocity treaty, was in the main due to the rapid growth of population in the eastern states, coincident with a gradual diminution of their home sources of supply, rendering it necessary for them to look abroad for their requirements.

It was during this period that many of the firms now prominent in connection with the lumbering and allied industries of the Ottawa Valley first established themselves. John R. Booth, one of the oldest and best known representatives of the trade, began business in 1858. Like those of most of the more extensive employers, his interests embrace a number of subsidiary interests, including a large pulp mill and railroad operations on a large scale. E. B. Eddy, head of the E. B. Eddy Company, began the manufacture of matches in 1854. In addition to this branch of the business and extensive lumbering operations, the company is engaged in the manufacture of woodenware and paper. The firm of Bronsons & Weston dates back to 1853, and was one of the first to establish a sawmill on a large scale at the Chaudiere. Other firms which flourished about this period or somewhat later, some of which are still extant or have been reorganized as incorporated companies, are A. H. Baldwin, established in 1853; Perley & Puttee, who commenced business at the Chaudiere in 1857; Gilmour & Co., who had extensive mills at Chelsea on the south bank of the Gatineau; Wright, Batson & Currier, and Hamilton & Co., proprietors of the large Hawkesbury mills near the Grenville Rapids, sixty miles from Ottawa down the Ottawa River.

In 1867 the confederation of the British North American provinces was accomplished, the old union between Upper and Lower Canada being dissolved. The former became the Province of Ontario and the latter the Province of Quebec. By the terms of the British North America Act, under which the Dominion of Canada was constituted, the control of public lands and forests was relegated to the several provinces. By that time considerable headway had been made in the understanding of how best to handle timber lands, but in the agitation over the question of union and in the multiplicity of large political issues which Canadians had to deal with in building up this confederation and opening transportation systems from ocean to ocean, the question of forestry was largely lost sight of for the time.

MANAGEMENT OF CROWN LANDS.

With confederation accomplished and with the knowledge that Crown lands would be henceforth one of the principal sources of provincial revenue (the customs, excise, etc., having gone to the Federal Parliament as a basis of its revenue), the leaders in Ontario turned their attention to the forests, and Honorable Stephen Richards, first Commissioner of Crown Lands for Ontario, rather patted himself on the back on his first reporting to the legislature that a bonus of \$519 a square mile, the largest price ever paid, had just been received at a timber sale for an eighteen-mile berth. Contrasted with the price of \$31,500 a mile paid in the sale of December, 1903, this seems insignificant, but it showed that the people were beginning to realize the value of this great asset. His first report, covering the year 1868, showed that the revenue from timber dues, ground rents and bonuses amounted to \$190,237. The change resulted in increased stringency in the management of the public domain. New regulations were issued, the dues being raised 50 percent of the previous rates and a uniform rate of ground rent fixed.

For some years the volume of exportation steadily increased, and the timber revenue went up by leaps and bounds. In 1868 the dues and ground rents amounted to \$190,237; and in 1869, owing to the 50 percent increase in the dues, increased business and more careful supervision, they went up to \$508,561. New regulations were adopted in 1869 which increased the ground rent to \$2 a square mile, and the dues to the following: Black walnut and oak, per cubic foot, 3 cents; elm, ash, tamarack, and maple, 2 cents; red pine and white pine, birch, basswood, cedar, buttonwood, cottonwood and all boom timber, 1¼ cents;

all other woods, 1 cent; red pine, white pine, basswood, buttonwood and cottonwood sawlogs, per standard of 200 feet board measure, 15 cents; walnut, oak and maple sawlogs, 25 cents; hemlock, spruce and other woods, 10 cents; pipe staves, per thousand, \$7; hemlock tanbark, per cord, 30 cents. The duties were to be collected upon exact measurement; but, where this could not be obtained, each stick was to be estimated as containing the following cubic feet: White pine, 70; red pine, 38; oak, 50; elm, 45, and all other woods, 34.

In 1870 the Dominion Parliament passed an act compelling lumbermen to mark their timber to be floated down stream and provided for a registry of such marks; and in 1873 the throwing of sawdust, slabs, edgings, bark, or refuse into any part of a navigable stream was prohibited.

About 1870 the industry was mainly centered in the Ottawa Valley and on the upper waters of the Trent River and waters tributary to the Georgian Bay. Production in the latter region had before that time been limited to a few mills, the output of which was principally consumed in the locality. But, with the advance of settlement, the shipment of lumber from this now important source of production began to increase as the country was opened up.

The beginning of lumbering operations in the Georgian Bay district on a comprehensive scale practically dates from the year 1872, when an extensive sale of timber limits, covering 5,301 square miles on the north shore of Lake Huron, was held, from which the Government realized \$602,665 in bonuses and ground rents. The territory included in this sale was largely unfit for agricultural settlement, and, large areas being uninhabited, the timber was exposed to depredations, as every facility existed for its being towed across the frontier. Among the principal purchasers of limits at this sale were McArthur Bros., Toronto; Rathbun & Son, of Mill Point, now Deseronto; Cook Bros., Toronto; James Eagan, Ottawa; Henry Kirk, Toronto; Geo. Green, Brampton; Isaac Cockburn, Toronto; W. H. Gibbs, Oshawa, and Hugh Macdonald, Toronto, some of which names are well known in the business world today.

This period of prosperity reached its climax in 1873, and was the time of the rise of the great lumbering industry of Michigan, Wisconsin and Minnesota, which production reached a volume far surpassing the Canadian output and forming the most considerable source of supply for the great West. The yield of sawn pine lumber of these great

pine-producing states reached the figure of 3,999,780,000 feet in 1873. Falling off during the protracted period of worldwide depression which followed, it increased again in 1880 and developed by leaps and bounds with the increased demand caused by immigration and settlement in the western states, until the high-water mark was reached in 1892 with the enormous total for that year of 8,594,222,802 feet.¹ From that time the output declined, owing partly to the exhaustion of sources of timber supply and partly to the exploitation of the southern forests and the substitution of other construction materials for pine.

RELATIONS WITH THE UNITED STATES.

The change in the lumbering situation in the neighboring states had an important bearing upon the trade in Canada. With the depletion of the pine forests in Michigan the dependence of the American consumer upon Canada for a portion of the lumber supply increased. It became the interest of the American manufacturer to secure this supply as far as possible in the form of raw material to be worked up in the American sawmills in those localities where the domestic forests no longer remained within access. It was equally the interest of the Canadians to export their forest product in as highly manufactured a form as possible.

A committee was appointed by the Federal house in the session of 1874 to look into the question of the export duty on sawlogs, etc., imposed in 1868. It reported that, reduced to an ad valorem rate, it averaged: On stave bolts, 40 percent; oak logs, 30 percent; pine logs, 20 percent; spruce logs, 25 percent, and shingle bolts, 25 percent. The committee reported that, while this enabled sawmill owners to buy cheaper logs, it hurt the settler and timber owner and at the same time did not result in the establishment of more mills.

The duty on oak logs and stave bolts was abolished in 1875. Things remained in this state until 1886, when the export duty on shingle bolts was fixed at \$1.50 a cord; on spruce logs, \$1 a thousand feet, and on pine logs, \$2. In November of the same year, by order in council, the export duty on sawlogs was increased from \$2 to \$3 a thousand feet; but July 5, 1889, in view of a probable understanding with the United States in regard to duties on Canadian manufactured lumber, the old rate was restored. The negotiations carried on while the McKinley bill was under consideration were successful, and in October, 1890, Sir

¹ Report of the *Northwestern Lumberman*, of Chicago, Illinois, itemised by mills. It is probable that unreported products, either of isolated mills omitted from the list, or of small lots produced by mills chiefly engaged in the cutting of hardwoods, would have brought the total well up toward 9,000,000,000 feet.

John Macdonald, after negotiating with the United States Secretary of State, James G. Blaine, removed the export duty on spruce and pine logs in consideration of the United States Congress reducing the import duty on sawn lumber from \$2 to \$1 a thousand.

When the Democrats came into power the duty on sawn lumber was removed under the Wilson bill and free trade on logs and lumber between Canada and the United States followed. While this was satisfactory to Canadian lumbermen, market conditions were such that it did them very little good, and lumber exports were less in 1892 than in 1889. The depression of 1893 was accompanied by low prices of lumber which lasted until 1898 and low prices in the United States were attributed to Canadian competition. As the outcome of this feeling, when the Dingley bill was passed in 1897 the old duty of \$2 on lumber was restored.

Large quantities of sawlogs were being exported to feed Michigan mills and the Michigan men, being naturally anxious to keep up the supply, adopted the expedient of a clause in the Dingley bill providing that if any country or dependency imposed an export duty the amount of such duty would be added to the import duty. This, if successful, would have transferred the bulk of the Georgian Bay trade to Michigan, because, if that state could get free logs while sawn lumber was charged a stiff duty, nothing could be sawn on the Georgian Bay for the United States market; and, if an export duty was imposed by Canada, then the duty on sawn lumber entering the United States would be prohibitory. The authors of the measure overlooked the fact that the Ontario government does not sell land and timber in fee simple as is done in the United States, but only sells a license to cut timber over a given area subject to the payment of Crown dues, retaining the ownership of the land.

The Georgian Bay lumbermen applied to the Dominion Parliament for an export duty, but the Government, fearing the imposition of retaliatory duties on sawn lumber by the United States, declined to act. The lumbermen then sought relief from the Ontario Provincial legislature. In the session of 1898 the legislature passed an act requiring that all logs cut on government land be manufactured in the Province. Since this was not a duty but the regulation of a landholder respecting its own property, the United States could not impose a retaliatory duty; but the Michigan holders of Ontario timber limits claimed that it was a breach of contract, in that by payment of the bonus they acquired the

limit and the right to cut pine thereon and to dispose of it as they saw fit.

The Government replied that the licenses were for one year only, and that to obtain a renewal of the license the next year they must submit to such regulations as the Government saw fit to impose. The Dominion Parliament refused to interfere and the courts decided in favor of the Provincial government. The effect of this has been to cause the removal of a large number of American lumbermen to Ontario to do a sawmill business there, and it seems to be taken for granted that the exportation of sawlogs from the Province will never again be permitted.

IMPORTANCE OF GEORGIAN BAY DISTRICT.

Michigan lumbermen are largely interested in lumbering operations and timber properties in the Georgian Bay district of Ontario. About 1890 lumbermen in the Saginaw district began making investments in Canadian pine, and increasingly large quantities of Canadian logs were rafted to eastern Michigan mills—80,000,000 feet in 1891, 300,000,000 in 1894 and 238,843,024 in 1898. In April, 1898, the act of the Ontario Legislature requiring logs cut on Crown lands in Canada to be manufactured in that country became effective and this was the death blow to the log rafting industry. At once Michigan men who had made investments in Canadian timber began preparations to manufacture their product in Canada, and now Holland & Graves, Eddy Bros. & Co., S. O. Fisher, The Moulthrop Lumber Company, The William Peter Estate, McArthur Bros. Company, McEwen & Dolson, Huron Lumber Company, Saginaw Lumber & Salt Company, Cleveland-Sarnia Sawmills Company, Loveland & Stone, George L. Burtis and a number of other concerns—with a few exceptions all hailing from Michigan—are operating in the Georgian Bay district.

The lumber industry in this district is the most important in Ontario, as, with the single exception of the Ottawa River district, which embraces a portion of Quebec Province and should not, therefore, be considered here, this district produces by far the largest amount of lumber of any portion of the Province. The condition of the lumber market of the United States is a great factor in determining prices in the Canadian lumber market. Shipments by water from the Georgian Bay ports have increased materially since the abolition of tolls on the Canadian canals. Birch and ash are manufactured and exported quite extensively to the United States. Hemlock, oak, elm and red pine are all used locally. Pickets, pine, cedar shingles, staves and lath are exported.

CHAPTER XIV.

ONTARIO—REVENUES AND RESOURCES.

In 1871 there was an extensive sale of limits in Muskoka and Parry Sound districts, fronting on Georgian Bay. The dues at this sale were double those of the previous one, white pine and red pine being two and one-half cents a foot, or thirty cents a standard. The area disposed of was 487 miles, and the price was \$117,672. A still more extensive sale was the one which took place in 1872, when 5,301 miles on the north shore of Lake Huron was disposed of for \$602,665. More than three-fifths of this area had previously been under license, but, with the exception of thirty square miles, all had been allowed to lapse.

Legislation was enacted gradually settling the settlers' rights and then came the great river and stream bill suit. This occurred in 1881, when the Ontario government passed an act permitting lumbermen on the upper reaches of streams to use slides and other improvements lower down upon the payment of reasonable dues. Peter MacLaren, the great Ottawa lumberman, who had made improvements on the Mississippi River in Lanark County, claimed the right to prohibit the lumber of the limit holders above him passing through his improvements. The Dominion government took the side of Mr. MacLaren and disallowed the Ontario act, but the case was finally determined in favor of Ontario, and since then lumbermen have had full right to use improvements upon paying tolls fixed by law.

In 1887 standing timber had so increased in value that the dues on sawlogs were increased to \$1 a thousand and upon square timber to two cents a foot. The ground rent was increased from \$2 to \$3 a mile. Under these regulations extensive sales were made on the Muskoka and Petawawa rivers. A new principle was introduced in 1892 when the lumbermen were restricted to the cutting of red pine and white pine, leaving spruce, cedar, hemlock, basswood and other woods to be disposed of otherwise by the Government. It was under these regulations that extensive sales were made in the districts of Nipissing, Algoma, Thunder Bay and Rainy River. The dues were increased to \$1.25 a thousand feet on sawlogs and \$25 a thousand cubic feet on square timbers. Notwithstanding this, higher prices were realized than ever

before. The mileage sold was 633, for which \$2,315,000 was realized, an average of \$3,657.18 a square mile.

The fluctuating state of the trade was shown in a return made to the Ontario Legislature in 1878 of the sawlogs, square and waney timber cut each year from 1868 to 1877:

SAWLOGS, SQUARE AND WANAY TIMBER CUT IN ONTARIO, FEET BOARD MEASURE.			
1868.....	177,390,000	1873.....	589,178,742
1869.....	375,620,200	1874.....	406,185,320
1870.....	300,900,850	1875.....	396,681,522
1871.....	358,066,400	1876.....	296,729,327
1872.....	669,569,542	1877.....	270,260,979

The Commissioner of Crown Lands figured that the waste of material in the shipping of square timber instead of sawlogs in the above meant a loss of revenue of \$3,577,500, or \$357,750 a year, and he urged changing over from square timber to sawlogs.

While for many years the cry has been heard that Ontario is at the end of her timber resources, this is not the view taken by certain well informed men. The late John Bertram, of Toronto, who was one of the best informed practical lumbermen and foresters in Canada, stated in an article published shortly before his death that, while there was a much increased demand for home consumption both in Ontario and in the prairie country in western Canada, he did not look for an increase in the quantity sawed in Ontario or Quebec because, "while there is a large quantity of pine and spruce still available, the forests are beginning to show signs of exhaustion, and it is a fortunate circumstance that many lumbermen are showing interest in the question of reafforestation. The Ontario government has shown wisdom in its system of fire ranging and in setting apart forest reserves in the territory not fit for cultivation. This will prolong the business indefinitely."

The most noteworthy feature of the lumber industry of recent years has been its rapid development in the northwestern portion of the Province. This has been stimulated by the growing demand for the output in Winnipeg and other parts of Manitoba, which look to the mills of Rat Portage, Rainy River, Fort Frances and other centers in the Rainy River district as their nearest source of supply. The continued migration to the West and the growth of Winnipeg have given a remarkable stimulus to the production of lumber in this portion of Ontario.

The income derived from timber forms a considerable portion of the revenue of the Province which, owing mainly to the large receipts from this source, is in the fortunate position of being entirely free from debt

and able to meet all the expenses of administration, in addition to spending a great deal of money in public services, such as elsewhere are sustained wholly by the municipalities, without resorting to direct taxation. In 1903 the total revenue collected from timber was \$2,307,356, the amount being exceptionally large, however, owing to the holding of an extensive timber sale, at which high prices were realized.

The increase in the value of this source of national wealth of late years was indicated by the result of this sale, at which about eight hundred and twenty-six square miles was disposed of. Notwithstanding that the timber dues were raised to \$2 a thousand feet board measure on logs, and to \$50 a thousand cubic feet on square timber, and the ground rent increased from \$3 to \$5 a square mile, the amount realized as bonuses was \$3,687,337, or an average of \$4,464 a mile. The highest price paid per mile was \$31,500. The new record this sale established as to the great and increasing value of the pine-bearing lands of Ontario has contributed much to educate public opinion as to the need of forest preservation and to strengthen the hands of the Government in its policy in that regard.

The total area now covered by timber licenses in Ontario is 17,033 square miles, of which 9,231 are in the western timber district and 6,637 in the Ottawa district. The total production of sawlogs in 1903 was 679,966,835 feet board measure, of which 549,488,617 came from the western district as against 104,576,242 from the Ottawa district. In pine boom and dimension timber the total output was 39,834,442 feet, the West leading in about the same proportion.

As the entire forest area of the Province is estimated at 102,000 square miles,¹ it will be seen that the territory now under license forms but a comparatively small proportion of the timber resources yet available.

It is customary in taking stock of the available assets in the way of pine timber, to ignore the territory already disposed of and under license, but some of this territory has been under license for over forty years, is still being operated and is contributing yearly to the provincial treasury, and, so long as this territory escapes the havoc of forest fires and is free from the settler's plow, so long will it continue a source of public revenue.

As to the available white pine supply in the Province outside the present licensed area, no attempt at a careful estimate has yet been

¹ An estimate later than that given on page 61.

made. E. J. Davis, Commissioner of Crown Lands for Ontario, speaking in the legislature February 18, 1904, gave an estimate prepared by his department. In this he estimated the amount of white pine still standing in Ontario at 10,000,000,000 feet, which would suffice for twenty sales such as that of December 9, 1903, when limits were sold for about \$3,500,000 in bonuses. This 10,000,000,000 feet should realize, he said, in bonuses \$75,000,000. The dues had been increased previous to the last sale from \$1.25 to \$2 a thousand feet, and the dues on this pine would produce at least \$20,000,000. The surveys of the north country had shown that there were at least 300,000,000 cords of pulpwood standing, which, with dues of twenty-five cents a cord (the present dues are forty cents) would produce \$75,000,000 for the provincial treasury. There was in sight at least \$200,000,000 of revenue, which at \$2,000,000 a year would last the Province for one hundred years. The average revenue in recent years from the forests, he pointed out, was between \$1,250,000 and \$1,500,000 a year, of which \$800,000 was dues. This was assuming that the forest was all used up as time went along; but he then explained what the Province was doing to keep up a perpetual supply. Passing over the small timber preserves where the Government, to allow the timber to grow again, has taken back into possession lands cut over or partly cut over under licenses, he described the reserves made in the virgin forest which had been rendered accessible by the building of the new government railway from North Bay to Lake Temagami and northward. The original Temagami Reserve around the lake of that name consisted of 2,200 square miles. This had been increased to 5,900 square miles and, when he spoke, it had just been decided to set apart 3,000 square miles in Algoma district to be known as the Mississauga Reserve. The old plan of license by which the lumbermen handed back the land to the Government when they had cut off the timber was probably the best that could be devised where the land was arable, for the Government could then grant it or sell it to the settlers; but in these reserves where the land is unsuited to agriculture another plan would have to be devised, which would probably take the form of a government forester marking the trees to be cut, which would then be sold by auction, the lumbermen agreeing to cut and carry away the timber in such a way as to reduce fire risk and give undeveloped trees a chance to grow. From the cutting of continually recurring crops of ripe timber on these reserves he anticipated a revenue of several million dollars a year to the treasury, and further reserves are to be made from time to time.

In a speech delivered March 12, 1901, in the Ontario Legislature, Hon. William A. Charlton (who has since assumed office as commissioner of public works) stated that the average yearly cut, including logs, boom and square timber, from 1867 until that date amounted to 549,141,408 feet. The largest cut of any one year was that of 1896, amounting to 952,000,000 feet. He estimated the total quantity of pine timber on lands then under license at 8,000,000,000 feet, and the quantity not under license at that time at 26,000,000,000, making in all 34,000,000,000 feet of pine timber then standing. He considered that, without reference to regrowth or reforestry, the supply was sufficient to last one hundred and fifty years.

The story of the westward movement of the trade is told in the report of square miles under license, although it is to be remarked that an immense area in the Ottawa district remains under license, showing that much of this district will permanently remain under timber.

Date.	Ottawa district.	Central district.	Western district.	Total.
1868.....	7,678	1,889	2,015	11,582
1869.....	7,678	1,889	2,016	11,583
1870.....	7,633	1,849	2,523	12,005
1871.....	7,512	1,951	3,041	12,504
1872.....	7,542	1,809	3,007	12,358
1873.....	7,386	2,038	5,111	14,535
1874.....	7,386	1,999	6,872	16,257
1875.....	7,406	2,022	7,621	17,049
1876.....	7,342	1,344	6,205	14,891
1877.....	7,356	1,806	6,970	16,132
1878.....	7,242	1,862	6,937	16,041
1879.....	7,202	1,203	7,679	16,084
1880.....	7,226	1,456	7,256	15,940
1881.....	7,194	1,875	6,558	15,627
1882.....	7,204	1,961	8,823	17,988
1883.....	6,989	1,638	8,259	16,886
1884.....	6,730	1,748	8,362	16,840
1885.....	6,503	1,537	9,174	17,214
1886.....	6,778	1,807	9,801	18,486
1887.....	6,698	1,324	7,828	15,850
1888.....	6,305	1,751	8,878	16,934
1889.....	6,547	1,489	9,190	17,226
1890.....	4,777	1,500	7,278	13,555
1891.....	7,316	1,474	7,030	15,820
1892.....	5,051	1,435	6,401	12,887
1893.....	6,758	1,696	8,790	17,244
1894.....	7,811	1,524	8,192	17,527
1895.....	6,589	1,509	9,753	17,851
1896.....	4,289	1,422	8,011	13,722
1897.....	7,272	1,429	7,699	16,400
1898.....	6,985	972	7,062	15,019
1899.....	5,359	1,386	8,913	15,657
1900.....	6,154	975	9,603	16,732
1901.....	6,292	949	10,950	18,191
1902.....	5,957	975	10,476	17,408
1903.....	6,637	1,165	9,231	17,033

The following table shows the quantities of the chief varieties of timber cut from Ontario Crown lands in the years indicated:

Date.	SAWLOGS.		SQUARE TIMBER.		Boom and dimension timber, pieces.	Railway ties, pieces.	Pulp-wood, cords.
	White pine, pieces.	Other, pieces.	White pine, cubic feet.	Other, cubic feet.			
1868.....	885,076	2,219	5,277,786	788,535	1,478	309,081	.....
1869.....	1,875,974	2,149	9,973,965	2,386,915	3,767	9,953	.....
1870.....	1,430,668	4,599	6,718,001	1,460,548	15,064	34,846	.....
1871.....	1,656,359	9,421	10,172,807	1,335,733	30,362	66,537	.....
1872.....	2,854,047	15,450	6,328,647	681,735	45,569	86,126	.....
1873.....	2,481,405	7,403	6,977,470	1,290,191	49,561	23,206	.....
1874.....	2,068,480	16,495	5,795,723	2,496,409	37,006	77,515	.....
1875.....	2,019,123	7,611	5,671,491	1,089,833	38,820	467	.....
1876.....	1,959,842	8,530	8,551,049	1,148,581	36,285	7,916	.....
1877.....	1,493,866	4,288	8,668,249	867,068	22,686	23,439	.....
1878.....	1,576,550	3,667	4,308,791	969,601	25,772	10,416	.....
1879.....	2,265,333	9,017	1,670,653	628,211	53,291	18,205	.....
1880.....	2,886,066	33,722	3,253,036	967,239	57,985	97,431	.....
1881.....	3,967,592	30,128	4,847,114	1,481,683	59,179	90,258	.....
1882.....	4,473,907	20,339	5,696,349	1,089,315	110,061	201,161	.....
1883.....	3,961,187	17,525	5,960,982	390,728	106,728	140,144	.....
1884.....	3,019,993	43,084	6,378,505	405,645	101,844	715,429	.....
1885.....	3,916,857	44,354	3,164,866	23,427	139,240	1,015,393	.....
1886.....	4,357,577	58,537	4,909,976	190,459	128,545	971,266	.....
1887.....	4,650,258	30,845	2,013,178	461,203	147,288	776,142	.....
1888.....	6,364,650	36,684	2,923,332	433,256	228,524	761,346	.....
1889.....	6,820,308	44,801	4,659,755	400,114	159,932	579,201	.....
1890.....	5,032,230	43,331	3,226,164	166,465	148,863	672,410	.....
1891.....	4,718,469	85,309	1,557,075	22,839	206,769	975,841	864
1892.....	6,424,475	110,415	3,841,853	17,466	250,394	628,898	7,544
1893.....	7,291,439	142,109	1,867,340	40,983	130,429	1,130,405	3,717
1894.....	7,573,447	131,691	1,173,576	.....	116,581	569,362	10,793
1895.....	9,586,546	231,072	873,304	.....	201,902	907,862	31,115
1896.....	10,865,461	306,327	1,128,666	.....	218,799	708,451	35,087
1897.....	5,381,511	167,567	1,977,400	28,909	150,505	278,955	46,368
1898.....	7,416,228	167,313	1,459,631	342,299	154,731	1,152,213	16,448
1899.....	6,521,922	323,946	1,723,274	135,843	221,230	453,855	29,898
1900.....	9,308,328	768,946	1,919,230	524,387	291,663	1,143,374	65,051
1901.....	8,688,312	928,780	1,755,881	719,107	287,136	1,449,427	47,738
1902.....	9,084,866	905,603	1,468,756	1,022,483	272,140	2,575,255	29,703
1903.....	10,609,924	1,251,215	806,777	482,523	345,329	2,150,573	61,027

The following is a list of Ontario timber sales from 1868 to the present time, showing the quantity sold and the price a mile. Sales are not held every year but only when it is deemed expedient. The table shows the constantly increasing value of timber.

Date.	Square miles sold.	Total price realized.	Dues.	Ground rent.	Highest price per mile.	Average price per mile.
December 23, 1868.....	38	\$ 14,446.50	\$0.50	\$2.00	\$ 519.00	\$ 380.17
July 6, 1869.....	98	25,564.50	.75	2.00	418.00	260.86
February 15, 1870.....	12	7,680.00	.75	2.00	640.00	640.00
November 23, 1871.....	487	117,672.00	.75	2.00	500.00	241.62
October 15, 1872.....	5,031	592,601.50	.75	2.00	1,000.00	117.79
June 6, 1877.....	375	75,739.00	.75	2.00	500.00	201.97
December 6, 1881.....	1,379	733,675.00	.75	2.00	2,300.00	532.03
October 22, 1885*.....	1,012	318,645.00	.75	2.00	1,250.00	314.86
December 15, 1887.....	459	1,312,312.50	1.00	3.00	6,300.00	2,859.06
October 1, 1890†.....	376	346,256.25	1.00	3.00	2,625.00	920.89
October 13, 1892.....	633	2,315,000.00	1.25	3.00	17,500.00	3,657.18
August 18, 1897.....	159½	265,162.50	1.25	3.00	6,600.00	1,665.07
December 20, 1899.....	360	723,550.00	1.25	3.00	8,500.00	2,009.86
September 17, 1901.....	399½	732,787.50	1.25	3.00	4,700.00	1,835.41
December 9, 1903.....	826	3,687,337.00	....	....	31,500.00	4,464.06

* Scattered, broken and forfeited berths. † Berths in Rainy River District.

The total amount of revenue received from timber by the Government of Ontario from 1868, the year following confederation, to the end of 1902 was \$29,583,386.

The prices realized in 1903 were the highest ever received by the Government from the sale of timber lands and emphasized the fact that the state of the lumber market will permit the payment of a much higher price for stumpage and that a corresponding increase in the revenue would result. It may be said, however, that the timber sold at this particular time was of exceptional value and was located on lands tributary to the Ottawa River, which affords an easy method of getting the timber to market. During the last few years the Ontario timber limits have been acquired rapidly and this also has served to stimulate business and prices.

Under the mode of procedure the Provincial government now follows the Commissioner of Crown Lands makes an occasional exploration and estimates the ungranted limits so as to guide him in the fixing of reserve bids, which are not announced, however. The lands to be disposed of are then cut up into small limits and advertised in the public press for sale. Subsequently the limits are sold at public auction to the highest bidder, if the price is above the reserve bid. The bonus bid pays for the license to cut the timber upon a stated limit, subject to such annual rents and stumpage dues as may be fixed by the Government. The purchasers of berths in the Nipissing and Algoma districts are entitled to cut red pine and white pine only, except such timber as may be required to make roads. The Rainy River berths include red pine, white pine, spruce, cedar, tamarack and poplar. The timber cut from all berths must be manufactured in Canada.

According to the Canadian census figures of 1901 the lumber and timber production of Ontario was as follows :

SQUARE, WANEY OR FLAT TIMBER, IN CUBIC FEET.

	Amount.	Value.
Ash.....	231,494	\$ 24,662
Birch.....	78,986	8,554
Elm.....	1,259,174	136,787
Maple.....	194,304	21,554
Oak.....	76,025	13,022
Pine.....	1,044,439	219,219
All other woods.....	906,236	94,868
Total.....	3,790,658	\$518,666

These figures serve to show not only the total magnitude of such production in the Province, but also the relative value of these manufactured products of the forests of Ontario. While the census has ar-

ranged the woods alphabetically, it will be discerned that Ontario pine leads all of the other woods in value and, indeed, nearly approaches their combined valuation. The census of 1901 gives also the following detailed figures relating to Ontario log production:

LOGS FOR LUMBER, IN FEET BOARD MEASURE.

	Amount	Value.
Elm	79,105,000	\$ 629,670
Hickory	1,445,000	17,304
Hemlock	84,175,000	482,447
Oak	8,842,000	126,901
Pine	984,352,000	10,116,667
Spruce	8,709,000	71,221
All other logs	167,994,000	1,320,558
Total	1,334,622,000	\$12,784,768
Pulpwood, cords	108,335	804,837
Miscellaneous products		8,068,464
Grand total of values		\$21,656,735

The same census shows 847 sawmills in operation in the Province, the total production of which in the census year was valued at \$25,-672,424.

The following statement is from data collected by *The Canada Lumberman*. It covers both the Ontario and Quebec sides of the Ottawa River:

PRODUCTION OF SAWMILLS IN THE OTTAWA VALLEY, IN FEET BOARD MEASURE.

	1902.	1903.	1904.
J. R. Booth, Ottawa, Ont.	125,000,000	115,000,000	115,000,000
W. C. Edwards & Co., Rockland, Que., and New Edinburgh, Ont.	85,000,000	95,000,000	95,000,000
McLachlin Brothers, Arnprior, Ont.	70,000,000	70,000,000	60,000,000
Hawkesbury Lumber Co., Hawkesbury, Ont.	50,000,000	50,000,000	50,000,000
St. Anthony Lumber Co., Whitney, Ont.	50,000,000	33,000,000	38,000,000
Gillies Bros., Braeside, Ont.	40,000,000	32,000,000	27,000,000
Gilmour & Hughson, Hull, Que.	40,000,000	28,000,000	30,000,000
Hull Lumber Company, Aylmer, Que.	40,000,000	15,000,000	20,000,000
Gilmour & Co., Trenton, Ont.	13,000,000	8,000,000	7,000,000
Pembroke Lumber Company, Pembroke, Ont.	14,000,000	12,000,000	15,000,000
G. H. Perley Company, Calumet, Que.	21,000,000	18,000,000	15,000,000
James MacLaren Co., Buckingham, Que.	25,000,000	25,000,000	20,000,000
J. R. & J. Gillies, Arnprior, Ont.	3,000,000	3,000,000	3,000,000
A. & P. White, Pembroke, Ont.	5,000,000	4,000,000	5,000,000
McLaren & McLaurin, East Templeton, Que.	27,000,000	27,000,000	20,000,000
Rideau Lumber Company, Ottawa, Ont.	5,000,000	5,000,000	5,300,000
Shepard & Morse, Ottawa, Ont.		12,000,000	15,000,000
Fraser & Co., Deschenes, Que.		5,000,000	25,000,000
Davidson & Thackray, Fort Coulonge, Que.		5,000,000	3,500,000
Total	613,000,000	562,000,000	565,800,000

The following figures show in round numbers the production of the Georgian Bay region in 1903 and 1904. There is a decrease in the latter year notwithstanding the fact that it embraces the cut of two or three mills not included in the 1903 statement. Of the cut indicated about ninety percent was pine and the rest hemlock and other woods:

	1903.	1904.
Midland.....	84,000,000	80,000,000
Parry Sound.....	57,000,000	50,000,000
Byng Inlet.....	42,000,000	52,000,000
Sarnia.....	36,000,000	45,000,000
Little Current.....	46,000,000	37,000,000
Victoria Harbor.....	50,000,000	46,000,000
Waubauskene.....	30,000,000	32,000,000
Blind River.....	51,000,000	43,000,000
Spragge.....	27,000,000	27,000,000
Sandwich.....	26,000,000	21,000,000
Gravenhurst.....	25,000,000	25,000,000
Cutler.....	37,000,000	28,000,000
Penetanguishene.....	40,000,000	17,000,000
Spanish River.....	16,000,000	23,000,000
Collingwood.....	16,000,000	16,000,000
Thessalon.....	16,000,000	25,000,000
John Island.....	17,000,000	17,000,000
Cache Bay.....	19,000,000	19,000,000
Huntsville.....	15,000,000	12,000,000
Bracebridge.....	14,000,000	14,000,000
Severn.....	5,000,000	5,000,000
Callander.....	10,000,000	8,500,000
Powassan.....	2,000,000	4,000,000
Bobcaygeon.....	4,000,000	3,000,000
Warren.....	15,000,000	1,500,000
Collins Inlet.....	5,000,000	5,000,000
Other points.....	36,000,000	40,000,000
Total.....	721,000,000	676,000,000

The principal firms operating in the Georgian Bay district are the following, the table giving the location of their sawmills and their output for 1904:

Saginaw Lumber & Salt Co., Sandwich.....	21,000,000
Cleveland-Sarnia Sawmills Co., Sarnia.....	27,500,000
Sarnia Bay Company, Sarnia.....	16,000,000
Charlton Sawmill Co., Collingwood.....	13,784,000
Eddy Bros. & Co., Blind River.....	28,000,000
Dolsen & McKean.....	16,000,000
Moulthrop Lumber Co., John Island.....	17,000,000
Playfair & Co., Midland.....	21,000,000
Smith Bros., South River.....	16,000,000
Chew Bros., Midland.....	14,000,000
Estate William Peter, Parry Sound.....	18,000,000
Parry Sound Lumber Company, Parry Sound.....	17,000,000
Conger Lumber Company, Parry Sound.....	13,000,000
G. G. Gladman, Parry Sound.....	6,000,000
Loveland & Stone, Cutler.....	33,000,000
Ontario Lumber Co., French River.....	8,000,000
Victoria Harbor Lumber Co., Victoria Harbor.....	46,000,000
John Bertram, Collins Inlet.....	5,000,000
Georgian Bay Lumber Co., Waubauskene.....	28,000,000
C. F. Beck & Co., Penetanguishene.....	11,000,000
W. & A. McArthur Co., Limited, Little Current.....	25,000,000
Conlon Bros., Little Current.....	7,000,000
George L. Burtis, Thessalon.....	17,541,929
N. & A. Dymont, Little Current.....	8,000,000
Huron Lumber Co., Spanish River.....	18,000,000
Nipissing Lumber Co., Spanish River.....	7,000,000
Holland & Graves, Byng Inlet.....	40,000,000
Total.....	495,825,929

In the above list will be found many names of historical interest in a consideration of the lumber industry of Ontario. There also appear the names of numerous American operators, who crossed Lake Huron when the exhaustion of their Michigan pine either threatened or actually occurred.

The total production of pine logs and timber in the Province of Ontario from 1879 to 1903 inclusive is recorded in the following table:

PRODUCTION OF PINE LOGS AND TIMBER IN ONTARIO.

Year.	Pine sawlogs. Ft. b. m.	Pine boom timber. Ft. b. m.	White pine sq. timber. Ft. b. m.	Total. Ft. b. m.
1879.....	322,807,200	10,084,000	29,986,368	362,877,568
1880.....	377,780,200	11,711,000	50,523,300	440,021,100
1881.....	493,735,000	19,388,000	75,945,564	589,069,164
1882.....	518,757,400	22,987,200	81,430,908	623,355,508
1883.....	443,366,200	19,563,000	76,221,168	539,150,368
1884.....	357,924,800	17,901,800	81,409,812	457,236,212
1885.....	469,601,400	29,922,200	38,259,516	537,783,116
1886.....	534,903,800	29,457,000	61,205,220	625,566,020
1887.....	567,803,200	31,216,800	29,692,680	628,712,680
1888.....	699,551,000	41,177,000	40,279,056	781,007,056
1889.....	723,727,633	32,000,237	60,718,308	816,446,178
1890.....	519,215,801	33,337,798	40,711,548	593,265,147
1891.....	451,207,505	37,844,115	18,958,968	508,010,588
1892.....	606,190,122	42,297,750	46,310,528	694,799,700
1893.....	718,215,271	24,276,520	22,899,876	765,391,667
1894.....	613,081,760	17,701,630	14,682,912	645,466,302
1895.....	800,565,355	32,170,013	10,479,648	843,215,016
1896.....	904,379,710	34,373,465	13,543,992	952,297,167
1897.....	477,716,448	25,640,239	23,728,800	527,085,487
1898.....	544,457,139	26,084,737	17,515,572	588,057,448
1899.....	498,607,068	29,361,695	20,679,288	548,648,051
1900.....	643,510,766	34,724,488	23,030,760	701,266,014
1901.....	598,433,958	32,755,638	21,070,572	652,260,168
1902.....	615,831,433	38,539,856	17,070,572	671,441,861
1903.....	679,906,835	39,834,442	9,681,324	729,422,601
Total.....	14,183,372,804	714,331,823	926,036,560	15,823,677,287

In 1900 a survey and exploration of northern Ontario was undertaken by ten exploration parties. The southern base of the exploration was the Canadian Pacific railway and the northern base the boundary of the Province. The area of the whole Province is about 167,000,000 acres, of which about 23,000,000 acres is included in the old and settled part, while the area explored embraces about 60,000,000 acres. From the summary of results obtained by the exploration, the following is extracted:

"The area is largely covered with extensive forests of spruce, jack pine and poplar. In the district of Nipissing north of the Canadian Pacific railway line, there is estimated to be at least 20,000,000 cords of pulpwood; in the district of Algoma, 100,000,000 cords; in the district of Thunder Bay, 150,000,000 cords, and in the district of Rainy River, 18,000,000 cords, a grand total of 288,000,000 cords. The pine region does not seem to extend much beyond the Height of Land, but on this side in the country around Lakes Temagami and Lady Evelyn and to the north, an area of red and white pine of fine quality was explored and estimated to contain about 3,000,000,000 feet board measure. There are also numerous smaller areas, both timber and land, which

are not included in these figures, but which will be available when the development of the country takes place."

As has been said, the revenue from forests has ranged about one and a quarter millions of dollars a year in recent years. How it has grown since confederation in 1867 is shown in the following figures. It will be noticed, also, how the western district (Georgian Bay and Lake Superior), which produced only about one-eighth of the revenue in 1868, in 1902 produced about five-sixths of the total.

ONTARIO REVENUE FROM BONUSES, TIMBER LICENSES AND GROUND RENTS IN THE YEARS INDICATED.

Year.	Ottawa district.	Central district.	Western district.	Total.
1868.....	\$117,006	\$ 84,078	\$ 33,123	\$ 234,209
1869.....	247,303	104,388	83,709	435,397
1870.....	264,842	87,784	73,273	425,901
1871.....	219,644	65,288	165,470	453,430
1872.....	306,612	162,739	96,790	*1,191,436
1873.....	202,814	63,278	87,717	* 643,724
1874.....	280,128	105,563	102,895	508,004
1875.....	194,248	54,976	40,069	289,294
1876.....	262,056	72,811	103,122	437,122
1877.....	203,282	62,118	161,155	426,556
1878.....	130,004	62,785	92,025	284,816
1879.....	150,257	63,291	118,464	332,014
1880.....	226,224	100,334	174,882	501,442
1881.....	269,990	88,424	159,946	* 839,716
1882.....	242,176	115,364	125,189	* 894,052
1883.....	250,919	110,393	144,234	505,547
1884.....	196,709	71,399	196,428	464,529
1885.....	187,114	80,716	333,507	604,338
1886.....	242,781	82,699	390,323	715,804
1887.....	258,738	94,029	638,078	990,855
1888.....	213,560	111,531	973,047	1,316,139
1889.....	380,111	158,306	640,180	1,078,598
1890.....	283,328	92,193	640,633	916,155
1891.....	256,708	72,178	603,723	1,022,619
1892.....	246,701	93,352	1,834,537	2,174,591
1893.....	178,856	65,679	1,512,469	1,757,005
1894.....	246,222	86,660	647,614	980,497
1895.....	266,765	19,261	567,152	853,179
1896.....	165,548	84,990	561,882	812,424
1897.....	393,003	64,589	869,547	1,327,140
1898.....	291,068	60,197	629,920	981,186
1899.....	186,163	111,362	795,322	1,092,848
1900.....	101,322	68,281	1,075,409	1,276,376
1901.....	221,721	40,487	1,217,638	1,479,847
1902.....	178,413	88,811	1,064,126	1,331,352
1903.....	193,535	33,049	2,080,771	2,307,356

*These totals were increased by sales held after the detailed statement of revenue by districts was made up.

CHAPTER XV.

ONTARIO—FOREST RESERVES.

At the outset the business of lumbering was regarded as an essentially transitory feature of the process of clearing and settling the country. In the older portions of Canada the greater part of the land denuded of its timber was suitable for agricultural settlement, and needed for farms by the incoming population. It was regarded as desirable to have the country cleared as quickly as possible for the plow. As lumbering operations were pushed farther back, a large territory was reached where most of the land was broken and sterile and not suited for farming, but where much of it was covered with valuable pine timber.

If the policy which was followed in clearing the agricultural lands of the southern part of the Province had been pursued in the newer territory, large areas, when stripped by the ax and the bush fires usually attendant on lumbering operations under old time methods, would have been practically worthless, their only value consisting of their timber-producing capacity.

The increase in the value of timber induced more conservative methods of cutting and led to the adoption of the system of fire ranging by which the danger of destruction of standing timber by bush fires has been greatly lessened. The large lumber operators realize that, instead of making a thorough clearance of their limits within the shortest possible time, it is often more profitable to treat the forest as a farm, reaping a periodical crop, with as little injury as possible to its reproductive capacity.

As large tracts of country in New Ontario were opened up for settlement and travel by the building of railroads, the question of what action to pursue regarding the large areas of valuable pine land, which if unprotected would be liable to destruction by bush fires, became one of increasing urgency.

An advance in the direction of establishing forest reserves from which settlers would be excluded was made in 1893 by the setting aside of the Algonquin National Park in the Nipissing District. This territory being under license, however, is not, strictly speaking, a forest reserve, though it serves some of the purposes of such. In June, 1897,

a royal commission was appointed, consisting of E. W. Rathbun, of Deseronto; John Bertram, Toronto; J. B. McWilliams, Peterboro; Alex. Kirkwood, chief clerk of the lands branch of the Crown lands department, and Thomas Southworth, clerk of forestry, to investigate and report on the subject of restoring and preserving the growth of white pine and other timber trees upon lands not adapted to agricultural purposes or to settlement. The two first named gentlemen were practical and experienced lumbermen. After a personal investigation extending over considerable tracts of country they presented a report, the most important feature of which was a recommendation that the Government take the power to withdraw from sale or settlement and set aside to be kept in permanent forest reserves such areas of territory as are generally unsuitable for settlement and yet valuable for growing timber.

In accordance with this recommendation the Ontario Legislature in 1898 conferred the requisite authority upon the administration by the Forest Reserves Act. The first action taken in pursuance of this policy was the creation of the Eastern Forest Reserve, consisting of 80,000 acres in the counties of Frontenac and Addington, in 1899. The following year the Sibley Reserve, comprising about 45,000 acres on the north shore of Lake Superior, was set apart. A more important step was taken in 1901 when the Temagami Forest Reserve was constituted, comprising an area of 2,200 square miles around Lake Temagami in the Nipissing district. This contains one of the most valuable of the pine forests in Ontario, the quantity of standing timber being roughly estimated at from 3,000,000,000 to 5,000,000,000 feet. This reserve was subsequently enlarged by the addition of territory to the north and west, bringing its area up to a total of 5,900 square miles. The Mississauga Reserve in the Algoma district was added to the list in 1904. It comprises about 3,000 square miles of virgin timber. It is altogether probable that as settlement advances in New Ontario, only the fringe of which has so far been touched by civilization, further areas will be set apart as forest reserves, wherever timber covered tracts of importance are found to exist on non-agricultural lands.

Of recent years, the forestry work of the Province of Ontario has been under the management of Thomas Southworth, spoken of above, with the title of Director of Forestry. His extensive studies and practical experience have qualified him to speak with particular authority of all the phases of this general subject of forest preservation and its financial aspects. For this reason we reproduce in this chapter an arti-

cle prepared by him at a recent date.¹ This article to a certain extent is a reproduction of what has been said elsewhere, but it so clearly explains and logically summarizes the whole subject that it is reproduced, as follows:

The Province of Ontario is one of the greatest business corporations in the world. Whether viewed in the light of an inheritor having a vast estate to dispose of, or as all this and a trading company as well, Ontario is an extensive corporation doing business in a very large way.

Its shareholders are the individual people of the Province, and handsome dividends are yearly paid to them in the form of the support of public services, charity and education, that would otherwise be paid for out of their private pockets in the form of taxes.

I presume it may be stated that the working capital of the Province is, through the right to levy taxes, only limited by the ability of the citizens to pay, as is the case with other similar corporations having more and richer shareholders, but it is proposed to refer only to the estate or inheritance common to us all in our land and water areas, and what they contain or produce. This includes land, forests, minerals, game, fish and water powers, all of which supply an income that could be increased if desired.

Unlike many corporations or trading companies, however, the Province realizes that there are ways in which the "greatest good to the greatest number" of the shareholders in this enterprise may be reached other than in the direct payment of cash dividends, and it has been deemed for the general good that the forest should be worked as the chief producer of cash dividends.

Therefore for the purpose of this article we will eliminate any consideration of any of the provincial assets other than that of the Crown forest.

The forest wealth of the Province has until recently been classed under two divisions: That still remaining the property of the Crown partly sold under license to lumbermen and partly without any claim at all; and that part held by settlers to whom lands had been allotted or sold by the Crown.

In the development of the timber trade in Ontario the idea gradually evolved was to dispose of the merchantable timber, principally pine, for cash revenue, before handing over the land on which it grew to individuals to be converted into farms. Having this idea in view, the business was not regarded as one of our permanent industries. The lumberman was considered as but the forerunner of the farmer, and no attempt was made for many years to do any more than harvest the standing crop of pine and other coniferous trees to the best advantage. No idea of taking off another crop than the original one was thought of. For many years this process worked well. As lumbermen established camps, and cut over their limits, the shantyman often became a farmer, squatting upon a tract of good land as he found it in the limit, and he was soon followed by his friends. This process has settled many townships in the Province, and where the land included in the limit was good for farming, no better plan could probably be devised. The hardwoods and enough pine for building purposes were left on the land for the settler,

¹ Published in *The Canada Lumberman* January 19, 1906.

and from the money received from the largest pine, roads were built for the settler and the whole people of the Province shared in the dividends.

As the lumberman pushed farther north in search of pine, however, the character of the country changed. Large areas were placed under license to lumbermen in which the land was unsuited for farming. The settler still followed the lumberman and tried to make farms where nature had provided that forests only could be profitably grown, finding out only after their capital and the best years of their lives had been spent, that they had made a mistake.

While these men have been wasting their efforts dragging out a bare existence, the Province has lost large sums in cash that might have been derived from these same areas had they been left to produce a second crop of pine timber.

In addition to the encroachments of settlers upon the forest area, fire proved a prominent factor in emphasizing the ephemeral character of the lumber industry; large tracts were burned over, until it began to be recognized as the natural thing that fire followed the lumberman. The success of the fire ranging system adopted in 1885 showed that this danger could be largely removed.

This partial immunity from forest fires led our legislators to consider the possibility of giving the forest industries a more permanent character, and in 1895, when I was appointed to the forestry work under the Government, I was directed by the then Commissioner of Crown Lands, the Hon. A. S. Hardy, to submit a report on the best method of reforesting these burned areas with pine; to ascertain the comparative cost of planting and of sowing tree seeds, with plan of operation.

Estimates of the cost of seedling trees for replanting were secured, and in the process of investigating the burned over areas to ascertain the probable cost of getting them in condition to replant or sow, I concluded and so reported that neither was necessary except in a few places. The cost of replanting or even of seeding successfully would be so great per acre that the directors of the corporation, the Legislature, would never vote the money necessary to accomplish the work over so large an area; and they would be right, for it is very likely that the initial expense compounded even at three percent, for the number of years necessary for the plantation to reach a merchantable age, plus the annual expenditure for protection and care, would exceed the amount realized from the crop even at the enhanced prices likely to be obtained at that time.

It may be said that even so, for the sake of the incidental or indirect benefits in the way of climatic effect and water supply the investment would be worth while, but it was found that planting was not at all necessary, that practically all the investment required was time and freedom from settlement or fire. On burned over territory a new forest was growing, and in nearly every case, where pine was present in the previous crop, pine was growing again, not at first perhaps; the first crop after the fire was usually birch, poplar or other trees that seed yearly and whose seeds carry immense distances, but nearly always pine followed where the fire had left any parent pine trees within a wide radius, and would be found growing up under the shade and protection of the broad leaved trees, under the exact conditions required to make good timber.

This condition of affairs simplified the problem of reforestation on Ontario Crown lands, and in my report to the Government in 1896 I recommended that areas found unsuited for general farming should be permanently withdrawn from settlement and placed in forest reserves.

In the following year the Government appointed a royal commission to report on the same subject. This commission included among its members two of the ablest lumbermen in Canada, the late E. W. Rathbun and the late John Bertram, and this commission indorsed this recommendation as follows:

"A large portion of the central division of the Province is more profitable from the standpoint of public revenue as forest land than under cultivation for farm crops, and as in addition to this it contains the headwaters of all our principal streams, all that part of this division found upon examination to be not well adapted for farming should be added to the permanent Crown forest reserves."

In 1898 the legislature passed an act entitled "An Act to Establish Forest Reserves," the first specific action by legislation toward the creation of a permanent Crown forest. This act was submitted to the legislature by Hon. J. M. Gibson, then Commissioner of Crown Lands, and was passed without a dissenting voice.

The passage of the forest reserves act, and the creation of reserves thereunder, is the formal announcement of the Government policy of gradually separating the non-agricultural from the agricultural lands, and is the first organized and definite attempt to create a permanent forest estate to be owned in perpetuity by the Crown and operated for timber crops. Under the act there have so far been created four forest reserves, amounting in all to 5,821,000 acres. These include the Eastern Forest Reserve of 80,000 acres; the Sibley Forest Reserve of 45,000 acres; the Temagami Forest Reserve of 3,776,000 acres, and the Mississauga Reserve of 1,920,000 acres.

There should be added to this Algonquin Park, created in 1893 mainly as a game preserve, with an acreage of 1,101,000 acres,² making a total of permanent forest reserves of 6,922,000 acres.

These reserves are of different character. The two former, the Eastern Reserve in Frontenac County and the Sibley Reserve, which takes in the township of Sibley including Thunder Cape on the north shore of Lake Superior, have been lumbered, and in most cases burned over, and now contain a very thrifty growth of white pine and other trees. It will be some time before they are ready again for lumbering operations, but the growth is very rapid and the time when they may be again operated for pine and other timbers will be much less than would be imagined in the absence of definite information and measurements of the rate of growth of this young timber.

The Temagami Reserve lies in the district of Nipissing and contains 5,900 square miles or 3,776,000 acres. This reserve besides including some of the most picturesque and beautiful lakes in the world, of which Temagami and Lady Evelyn might be mentioned, contains a very large quantity of pine timber now ready to be cut. About forty years ago the band of Indians living in the territory, alarmed at the incursions of the lumbermen who were operating on Lake Temiscamingue and at the suggestion, it is said, of a Hudson Bay officer equally interested with them in the preservation of this country as a hunting ground, started a fire that swept over a good many hundreds of square miles, including the northern part of Temagami, Lady Evelyn, Anima, Nipissing and other lakes. Over this burned territory there is now a thrifty growth of poplar, birch, as well as pine and other coniferous

² The area of Algonquin Park is placed at 1,109,383 acres in other carefully compiled statistics on Ontario, which are at hand.

trees, the pine making growth at the rate of one inch in diameter in about two and a half to three years. Of the timber now sufficiently large to cut or what would be estimated by a lumberman in buying the territory for lumbering, I believe there is about five thousand millions, or five billions of feet board measure, exclusive of spruce, tamarack and hardwoods.

The Mississauga Reserve is included in the territory drained by the Winnebago and Mississauga rivers in the district of Algoma, and lies between the main line of the Canadian Pacific railway and the Sault Ste. Marie branch of the same line. It comprises a territory of 3,000 square miles, or 1,920,000 acres, and is estimated to contain over three thousand millions of feet of merchantable white pine besides other timbers.

In giving these figures of areas of forest reserves, it must be borne in mind that the Government has only recently entered upon this policy, and it requires time to properly investigate the different areas before having them come under the provisions of the forest reserves act. By the act a reserve can be created by order in council, but if on further investigation it was found desirable to open this land for agricultural purposes, a subsequent act of the legislature would be necessary in order to take it out of the reserves. In a general way, however, we are aware that there is a very large territory in the Province of Ontario peculiarly suitable for permanent forests.

So far as the question of future timber supplies and the consequent effect on climate and industrial conditions are concerned the Province of Ontario is in a peculiarly fortunate condition. The southern part of the Province which extends almost into the middle of the United States is a very rich agricultural section, now entirely settled up, and the home of a prosperous agricultural community. North of this agricultural belt, stretching across the Province from east to west, lies the watershed separating the streams flowing south into the Great Lakes and the St. Lawrence from those flowing north into our great Canadian sea. This height of land or watershed is not a mountainous ridge, but a more or less level tableland, rugged and rough in character, for the most part quite unsuited for agriculture, but the natural home of the white and red pine, spruce and other coniferous trees. True, in this belt there are occasional valleys of good land. In the Temiscamingue district for instance, there are nearly a million acres of rich alluvial clay soil. There is also a good agricultural section in the Rainy River Valley and another one at Wabigoon on the main line of the Canadian Pacific railway. But generally speaking, that is the character of this immense watershed stretching hundreds of miles across the Province from east to west.

North of this territory again, on the slope running to Hudson Bay, lies another agricultural district, estimated to contain over sixteen millions of acres of first class farming land, but covered at present with a very valuable growth of spruce and other timber.

In estimating the annual dividends possible or likely to be derived from this forest asset, a good many things have to be taken into account. While the reserves so far created are pine-bearing, not all of the territory suitable for reserves contains pine at present though it may be made to do so. Some of this territory is rocky and has been so severely burned over, notably on the north shore of Lake Superior, as to have no soil left, and we need to figure on long periods of time before those

small areas will become productive. There must also be eliminated the water areas, and fire must be counted on as a contingency.

The present forest reserve area includes distinctly pine-bearing lands, and for purposes of computation over the whole area, I will take this area 6,922,000 acres as a basis. In a country where we have no large artificial plantations that have reached maturity from the seed, it is difficult to form definite conclusions as to the annual growth of timber, but from measurements obtained by the Washington Bureau of Forestry over many parts of the northern or pine-bearing states, they have adopted nearly sixty cubic feet as the normal annual growth under ordinary forest conditions on an acre of forest land. This includes the whole of all sorts of trees, not pine alone. This in board measure would be 720 feet per acre per year. In our pine-bearing land, particularly in the reserves referred to, white pine is not the only tree, but it is the dominant tree, and a large proportion of this annual growth will be of that variety of timber.

Pinchot and Graves, in their exhaustive study of the white pine in Pennsylvania, estimate that a pine tree ten inches in diameter will yield 84 percent of merchantable timber, and in a tree twenty-six inches diameter only seven percent is waste. Under continuous operations, 10 percent would be a fair allowance for waste in all kinds of timber, but there should also be eliminated much solid timber not now merchantable. With allowance also for water areas and spots not well seeded, I do not think 300 feet board measure per acre an unreasonable estimate for the annual growth of pine on an acre of land in the areas. That it is not unreasonable is shown from yields on lands that have been cut over. There are numerous instances where 50,000 feet of pine per acre have been cut, and this where only the merchantable trees were removed, leaving many others on the way to a merchantable size, while our estimate is for the total annual growth.

An ordinary forest well seeded to pine would produce this 50,000 feet in about one hundred years or at the rate of 500 feet per year. One other deduction must be made, however, for fire, for while we have greatly lessened the damage from this source, it must be counted on, and we will reduce this estimate 50 percent or 150 feet board measure an acre a year for the pine timber only. This estimate applied to our present reserves would give an annual production of 1,038,300,000 feet.

As to the value of this timber, much depends on its location and ease of access to market. On the basis of the recent timber sale, \$7 per thousand feet would be a fair average as applied to the reserves in question. This would return annually \$7,268,100. This sum appears large, but it must be borne in mind that the territory now being operated each year, probably not so large as this, returns \$1,000,000 to the treasury, and at \$1.25 instead of \$7 per thousand feet.

It would, perhaps, be unfair to apply the prices realized at the recent sale to the whole of this area, but to reduce it to \$5, a very modest estimate, the annual increment in pine would reach a value of \$5,191,500, and besides the other timbers growing on the reserves, spruce, cedar, birch, larch, maple, etc., have a commercial value that is rapidly increasing.

One hundred and fifty thousand feet board measure at \$5 per thousand would be worth 75 cents as the annual rental value of this land. It may at first sight appear high, but the Prussian Crown forests under a most expensive semimilitary

system of management, including the cost of maintaining several forestry schools and colleges, yield a net income over all expenses of about \$1.45 an acre a year over the whole territory good and bad. I am well aware of the difference in conditions as to markets, etc., but surely if the Germans can obtain a *net* revenue of \$1.45, we can, in time at least, under proper management, realize half that sum as our *gross revenue*. I might also add that the Crown forests of Saxony yield about \$4.50 an acre a year, net.

A recent concrete instance of the growth of pine under somewhat adverse circumstances is shown by the result of a small plantation of pine trees on the sand plains of Nebraska. This plantation covers .52 of an acre on the ranch of Bruner Bros., in Holt County, Nebraska. It is rectangular in form, measuring 70x192 feet, and is located in sand hills bordering a dry valley. The trees on this plantation were set out in the spring of 1891 as three-year-old seedlings averaging about eight inches in height. Furrows were turned two feet apart, and the trees were planted two feet apart in the furrows. Since planting, the trees have received no cultivation whatever, but they have been protected from fire and stock. The altitude of the location is 2,200 feet.

This sand is what is ordinarily called blow sand and covered some of the small seedlings. Last year the Bureau of Forestry at Washington had these trees counted and measured, when it was found that the total volume of wood in the plantation was 586.02 cubic feet, with a total annual growth of 50.6 cubic feet. This, converted into board measure, would be over 600 feet a year on a fraction over half an acre, or 1,200 feet an acre a year.

It is true these trees were planted at regular intervals, and would therefore have a better chance for growth than trees reproduced by nature with her wasteful methods, but it must also be remembered that the soil was very bad and of such a nature as had been considered hitherto quite incapable of growing trees at all.

Hence it will be seen that my estimate of 150 feet board measure an acre a year in our peculiar pine-bearing country is a very moderate estimate. Applying this estimate to say 40,000,000 acres of permanent reserves, which I hope to live to see, we have a yearly growth of 6,000,000,000 feet, which at \$5 per thousand would represent a value of \$30,000,000.

This is not a rosy picture, but a very conservative estimate, and if the timber other than pine is considered, it will be found low.

And now, having definitely adopted the policy of separating agricultural from non-agricultural lands, placing large areas of non-agricultural lands in reserves to form a permanent Crown forest to be operated in perpetuity for timber supplies and the payment of cash dividends, the problem is presented of how to work these reserves to the best advantage.

In this various problems present themselves. The first, of course, is the great one of fire protection, but this I am happy to say we are within reasonable distance of having solved. Of course in the forest, as in the city, the prevention of fires entirely is an impossibility, and in the forest there is the added difficulty not often found in well regulated cities, that a fire once under headway cannot be checked by any human agency at present known. At the same time the system of patrol adopted some years ago is proving very effective, and our losses from fires for the past few years have been inconsiderable.

Among the most serious problems confronting the Government in the permanent timber policy, is the reproduction of the right kind of species from a commercial point of view. This Province is the habitat of probably the most valuable timber tree in the world, the Weymouth or white pine, the tree that has been so great a factor in the prosperity of the Province. There are peculiar features connected with its reproduction that have to be carefully considered in any permanent forestry operations.

In the first place, I have noticed that where a forest has been operated for pine for a number of years, and where no fire has taken place, there seem to be no seedling pines coming up. True, there are pine trees still growing to take the place of the mature trees removed, but they are trees that were suppressed and stunted in their growth at the time of the previous lumbering operations, and that took on new growth after the pressure in the forest was relieved, but I cannot find that in a forest of this sort there is any new crop coming on, that is to say, trees that have seeded since the cutting of the original crop.

Why this is so is not quite clear to me, but I imagine the reason will be found in the fact that the ground and the conditions of shade are not suitable for the proper germination and growth of the pine seeds.

On the other hand, where there has been a forest fire, after lumbering operations, we nearly always find a growth of young pine coming up, at any rate if any old or seed trees have been left in the vicinity of the fire.

Assuming this condition of affairs to be general, that young pine will not come up as a second crop except under suitable conditions, it will readily be seen that if in operating an old forest, nothing but the pine trees are taken out, the result must eventually be that the character of the forest will have changed from a pine forest to one of another description, and necessarily of a less valuable character. If it is pine mixed with spruce, if the pine is removed and the spruce only allowed to reproduce, it will naturally become a spruce forest, or a hardwood forest as the case may be.

Hence it is obvious that in operating an old or virgin forest with a view of reproduction of the most valuable sorts of trees, a scientific knowledge of the growth and method of reproduction of these trees will be necessary in order to have the cutting properly executed. This must be done also with a view to the financial part of the operation, because whether in private forestry or government forestry, it must necessarily be largely a commercial proposition, and the cost of operating must be considered in its relation to the ultimate profit.

This is one of the problems confronting us. There are others of a more or less technical nature, and for their solution scientifically trained men will, in my opinion, be necessary. That we have many men engaged in the lumbering business who are highly skilled men indeed in the operation of removing the present standing crop of timber as expeditiously and economically as possible, is true, but their training is not extended to the problem of removing this timber with any regard to a future crop.

While we need scientifically trained men for this purpose, men with a knowledge of botany, plant pathology and general silviculture, as these men would have to be employed partly by the Government, partly by lumbermen, it would be necessary that in addition to these things they should also be expert lumbermen, and

have a thorough knowledge of logging, driving to market, sawing, culling lumber, etc., so that in addition to the training they could receive in the schools, their education would be utterly incomplete without the other training in the bush and in the sawmill, as well as in the lumber yard.

For the proper management of our permanent forests, well trained men will be needed and it will require the joint training of the college, the bush and the sawmill to produce them.

It is difficult to estimate the far-reaching consequences of this policy in securing a permanent source of future supply against the time when the present demand for lumber and other forest products will have enormously increased and many now productive areas, if worked in the ordinary way, will have become depleted. The intention of the Government of the Province is that these reserves shall be operated in accordance with forestry principles, removing only the mature timber from time to time with as little injury as possible to the young growth and the reproductive character of the forest in order that the supply may be perpetually maintained.

CHAPTER XVI.

ONTARIO—TORONTO INSPECTION.

The following rules and regulations for the inspection of pine and hardwood lumber were adopted by the lumber section of the Board of Trade of the City of Toronto, Ontario, in 1890. Though now obsolete, they are of historical interest.

PINE LUMBER.

INSTRUCTIONS FOR INSPECTION.

Inspectors of lumber must measure and inspect each piece as they find it, of full length and width. Imperfections are not to be measured out.

All lumber must be put into the grade its defects call for, regardless of measurement.

All lumber over 1 inch in thickness must be measured full, with the $\frac{1}{4}$ or $\frac{1}{2}$ added on each piece (no fraction in width allowed).

In inspection the inspector is instructed to use his best judgment, based upon the rules laid down for his guidance.

The standard knot is to be considered as not exceeding $1\frac{1}{4}$ inches in diameter.

Splits are a greater or lesser defect in lumber, and must be considered accordingly.

All lumber must be cut plump in thickness and be well manufactured, and all lumber imperfectly manufactured shall be classed as culls.

GRADES.

The following shall be the grades of lumber sanctioned by the Council of the Board of Trade for the Lumber Section of the Board of Trade of the City of Toronto :

Clear Lumber.—Clear lumber shall be perfect in all respects and free from wane, rot, shake or check, not less than 12 feet long, 8 inches wide and 1 inch thick. A piece 12 inches wide will admit of imperfections to the extent of one standard knot or its equivalent in sap. In lumber over 12 inches wide the inspector must use his best judgment in accordance with the instructions above given.

Picks.—Pickings must not be less than 12 feet long, 8 inches wide and 1 inch in thickness, well manufactured and free from wane, rot, shake or check. A piece 8 inches wide will admit of one standard knot, or imperfections in sap to the same extent. A piece 12 inches wide will admit of two standard knots, or imperfections in sap to the same extent. For lumber wider than 12 inches, of this grade, inspectors will carry out the instructions as given regarding wide, clear lumber.

No. 1 Cutting Up.—No. 1 cutting up shall not be less than 12 feet long, 7 inches wide and 1 inch in thickness. Clear pieces 10 feet long and the required width are included in this grade; this must be free from wane, rot, shake or check.

Pieces from 7 to 9 inches wide will admit of imperfections to the extent of two standard knots or their equivalent in sap. Pieces from 10 to 12 inches wide will admit of three standard knots or imperfections equivalent to them in sap, and wider for lumber of this grade inspectors will follow instructions as given in two previous grades. Inspectors are informed that this grade of lumber is expected to cut out two-thirds clear in profitable lengths to the consumer.

No. 2 Cutting Up.—No. 2 cutting up shall not be less than 10 feet long, 6 inches wide and 1 inch in thickness, and shall cut at least one-half clear in accordance with the instructions as given above regarding No. 1 cutting up lumber.

Fine Dressing.—This grade of lumber shall be generally of a sound character, and shall be free from wane, rot, shake or check, not less than 10 feet long, 7 inches wide and 1 inch in thickness. A piece 7 inches wide will admit of one or more knots which can be covered with a ten-cent piece if they are sound. A piece wider than 7 inches will admit of one or more knots of the same size according to the judgment of the inspector in regard to the width.

Common Dressing.—Common dressing shall not be less than 10 feet long, 7 inches wide and 1 inch in thickness, and shall be free from wane, rot or check, and shall be generally of a sound character, and will admit of standard knots that will not unfit it for dressing purposes.

Common.—Common shall be free from rot and unsound knots, and well manufactured, not less than 10 feet long, 7 inches wide and 1 inch in thickness.

Strips.—Clear strips shall be from 4 to 6 inches wide, not less than 12 feet long, and 1 inch in thickness, and shall have one perfectly clear face, free from all imperfections; bright sap will be permitted on the reverse side.

Sap Strips.—Sap strips for fine dressing shall be from 4 to 6 inches wide, not less than 12 feet long and 1 inch in thickness, and will admit of one knot which can be covered by a 10-cent piece in a piece 4 inches wide, and two knots of like size in a piece 6 inches wide. All strips free from other imperfections and having bright sap on two sides would be admitted into this grade.

Common Dressing Strips.—Common dressing strips shall be from 4 to 6 inches wide, not less than 10 feet long, and 1 inch in thickness, and shall be well manufactured and generally of a sound character; will admit of knots which are sound and not coarse, and which will not unfit it for ordinary dressing purposes.

Common Strips.—Common strips shall be from 4 to 6 inches in width, not less than 10 feet long and 1 inch in thickness, free from rot and wane and to be of a coarse, sound character.

No. 1 Culls.—This grade shall consist of lumber above the grade of No. 2 culls and shall admit of coarse knots and stain and be free from rot. It shall also admit of pieces imperfectly manufactured below 1 inch in thickness and perfectly sound, and not rendered worthless through improper manufacture.

No. 2 Culls.—No. 2 culls shall be lumber that will work one-half sound.

No. 1 Lath.—No. 1 lath shall be 4 feet long, and shall be when cut $1\frac{1}{2}$, $1\frac{1}{4}$ and $1\frac{3}{4}$ inches in width, cut out of good, sound, live timber, free from wane, rot or knots, well manufactured and trimmed square at the ends.

No. 2 Lath.—No. 2 lath shall be of the same width and length as No. 1 lath, and shall admit of a small portion of wane, and also will admit of lath sap stained, and will admit of small, sound knots; must otherwise be well manufactured.

No. XXX Shingles.—No. XXX shingles, packed in 4 bunches to the 1,000, of 250 each, free from all rot, shake, sap, knots, pin holes, bastards, or defects of any nature. A shingle 4 inches being the standard, 16-inch shingles should be 5 shingles to 2 inches thickness at butt, with $\frac{1}{8}$ inch points, and 18-inch shingles, 5 to 2 $\frac{1}{4}$ inches thickness at butt, and $\frac{1}{8}$ at points, to be well manufactured and well pointed.

No. XX 6-Inch Clear Butts.—No. XX 6-inch clear butts must be perfect for at least 6 inches from butts, and the defects from this hereon to be of water-tight character, and same regulation regarding thickness as XXX shingles.

No. 1.—No. 1 to be of a grade not specially up to, so as to be considered in, either of above grades, and to be sold by special agreement.

All Other Shingles.—All other shingles are culls, and their value is to be a matter of arrangement, if they have any market value.

HARDWOOD LUMBER.

INSTRUCTIONS FOR INSPECTION.

It is impossible to make rules that will govern every piece of lumber, there being no two pieces of lumber exactly alike. It is therefore expected that the inspector shall be a person of experience, and use his best judgment, based upon the general rules given, making no allowance for the purpose of raising or lowering the grades of a piece.

The inspector must not favor either the buyer or seller, but take lumber as he finds it, and pass each piece into the grade to which it belongs. Inspectors should examine all lumber on the poorest side, except flooring. All lumber must be measured in even lengths, excepting stock that is cut to order for special purposes, when it shall be measured for the full contents. Bark or waney pieces shall be measured inside the bark or wane. All tapering pieces will be measured one-third the length of the piece from the small end.

All badly cut lumber shall be classed as cull, or placed one grade below what it would be if properly manufactured. All lumber shall be sawed thick enough to meet the required thickness when seasoned. Lumber sawed for newels, columns, balusters, axles, or other specific purposes, must be inspected with a view of the intended use of the piece, and the adaptability for that purpose, as in most cases it cannot be utilized for other purposes. Heart pieces are excluded from all grades above cull. Worm holes are considered one of the most serious defects. Gum spots in cherry is a defect, and, if excessive, will lower the piece one or two grades. Warped, twisted, stained and stick-rotten lumber shall either be classed as cull, or mill cull and refuse.

The standard lengths of whitewood to be 12, 14 and 16 feet, admitting 10 percent of 10 feet lengths; walnut and cherry, 10, 12, 14 and 16 feet lengths, admitting 10 percent of 8 feet; 8 feet to be admitted as No. 1 must be 12 inches wide and upwards; to grade as No. 2, 8 inches wide and upwards.

A standard knot must not exceed 1 $\frac{1}{4}$ inches in diameter, and must be sound. Log run shall be the unpicked run of the log, mill cull out. Lumber sold on grade, and without special contract will be measured according to these rules. The inspector will be required to keep a correct copy of all measurements, and give duplicate of same to both buyer and seller if required.

In all grades mentioned as combined in No. 1 and No. 2, all pieces less than 8 inches shall be considered as seconds.

BLACK WALNUT.

Combined grade of firsts and seconds, rejects and shipping culls.

No. 1.—No. 1, from 8 to 10 inches, shall be clear of all defects; 10 to 16 inches wide may have $1\frac{1}{2}$ inches bright sap, or one standard knot; 16 inches wide and upwards may have 2 inches bright sap, or two standard knots showing on one side only.

Seconds.—Seconds, 6 inches wide and upwards, must be clear of all defects at 7 inches; at 10 inches will admit of $1\frac{1}{2}$ inches sap or two standard knots; 10 to 16 inches wide will admit of 2 inches sap, or two standard knots; 16 inches wide and upwards may have 3 inches sap, or three standard knots; 12 inches wide and upwards will admit of a split, if straight, $\frac{1}{6}$ the length of the piece, provided the piece be equal to No. 1 in other respects. Not over 10 percent of seconds will be taken with splits of the above character.

Rejects.—Rejects, 5 inches wide and upwards; at 7 inches may have 1 inch sap, or one standard knot; 7 to 12 inches wide may have 2 inches sap, or two sound knots; 12 to 18 inches wide may have 4 inches sap, or four sound knots; above 18 inches may have 5 inches bright, sound sap.

Shipping Cull.—Shipping cull will include all lumber not equal to the above that will average and work two-thirds its width and length.

CHERRY AND BUTTERNUT

Will be graded and inspected according to the rules given for black walnut, with the exception of gum specks in cherry. (See instructions.)

WHITEWOOD, COTTONWOOD OR BALM OF GILEAD

Will include the combined grade of first and seconds—No. 1 common, No. 2 common, or shipping cull. The combined grade of firsts and seconds shall not be less than 65 percent of No. 1.

No. 1.—No. 1 shall be 10 inches wide and upwards, and clear of all defects at 12 inches; 12 to 15 inches may have $1\frac{1}{2}$ inches bright sap, or one standard knot showing on one side only; 15 to 18 inches may have 2 inches sap; 18 inches and upwards may have 3 inches sap, or two standard knots showing on one side only.

Seconds.—Seconds, 8 inches wide and upwards, clear of all defects at 9 inches; at 10 inches wide, may have one standard knot or a split not over 12 inches long; 15 to 18 inches wide may have two standard knots, or 3 inches bright sap; 18 to 22 inches may have three standard knots or 4 inches bright, sound sap.

No. 1 Common.—No. 1 common shall be 6 inches wide and upwards, bright, sound and clear sap, not a defect in this grade; 8 to 12 inches wide, may have three standard knots; 12 to 16 inches wide, four standard knots; 16 to 24 inches, five standard knots, or may have straight heart cracks not showing over one-quarter the length of the piece, if it has no other defect excepting bright sap.

No. 2 Common or Shipping Cull.—No. 2 common or shipping cull will include lumber with more defects than the No. 1 common. Pieces will be received where two-thirds of the piece will be available for use for rough manufacturing purposes; stained sap or other defects will be received in this grade; dozed and rotten sap, and other lumber, than as above named, will be classed as mill cull or refuse, and have no standard value.

BASSWOOD

Shall be inspected the same way as whitewood, cottonwood or balm of Gilead, with the exception that seconds will take lumber 6 inches wide and up.

ASH AND OAK

Shall be graded as firsts and seconds, and shall be 6 inches and over in width.

Boards or Plank.—Boards or plank 8 inches wide will admit of one standard knot or one defect; 10 inches and over wide will admit of two or more defects, according to the width of the piece; bright sap is not considered a defect.

Culls.—Culls include all width, lengths and sizes, except such stock as will not work one-half without waste. Other than the above are classed as mill culls and have no value in this market.

CHESTNUT

Shall be 6 inches and over in width, and clear up to 8 inches. Pieces 9 inches wide may have three standard knots; over 12 inches wide, four standard knots. This grade must be absolutely free from worm or pin holes. Culls shall constitute all lumber below the above grade that will cut one-half without waste.

SYCAMORE

Shall be inspected the same way as oak and ash.

HICKORY

Shall be inspected the same as oak and ash.

ROCK AND SOFT ELM

Shall be 6 inches and up wide, and up to 10 inches shall be perfect. Beyond that width shall take the inspection given to oak and ash.

HARD AND SOFT MAPLE

Shall be inspected for firsts and seconds in the same manner as oak and ash.

Clear Maple Flooring.—Clear maple flooring shall have at least one clear face, and two edges also clear.

Common Maple Flooring.—Common maple flooring shall be of the same general character as clear; may have one or two small sound knots of not more than $\frac{1}{4}$ of an inch in diameter, or a small wane on one edge, which will not injure it for working its full size without waste.

BIRCH

Shall have the same inspection as hard and soft maple, with the exception that sap is considered a defect more than in maple.

CHAPTER XVII.

ONTARIO—PERSONNEL.

In the preceding chapters which treat of the lumber history of the Province of Ontario, are many references to individuals; but the sequential character of most of the narrative, which relates to timber and lumber rather than to individuals, did not permit of specific reference to many persons who were prominent in the lumber industry and the operations of many of whom should have a place in any history of the lumber industry in Canada. This chapter, therefore, is devoted to a brief definition of the place of certain individuals, firms and companies in the lumber development of Ontario during the last hundred years. By no means all who should be included are mentioned and to those an apology is perhaps due, but the list includes those regarding whom data were immediately available.

As in the chapter devoted to the personnel of the Quebec industry, there is a certain co-mingling of interests. The Ottawa Valley includes sections of both Ontario and Quebec, the river forming, as it does, the boundary line between the two provinces. Some Ottawa lumbermen have had their chief holdings in Quebec waters, while some residing and having mills on the Quebec side of the river have had timber holdings in Ontario. From some standpoints the history of the Ottawa Valley, without regard to provincial lines, would have been more desirable; but the plan of the work made most desirable the present arrangement, which in this particular connection seems somewhat arbitrary. For one who would secure a comprehensive view of the Ottawa Valley as a whole it will be necessary to read the history of both provinces and the account of the personnel of each.

THE WHITE FAMILY.

The town of Pembroke, about one hundred and twenty miles up the river from Ottawa, was founded in 1828 by Col. Peter White, a native of Edinburgh, Scotland, who was for many years one of the principal timber merchants of the Ottawa Valley. His sons have been actively engaged in the lumber business and by their enterprise have done much to build up their native town. Hon. Peter White, born at Pembroke August 30, 1838, after receiving a business training from an Ottawa

mercantile firm, entered into partnership with his brother, Andrew T. White, now deceased, as A. & P. White, and for many years carried on an extensive lumber business which is still continued under the firm name. Mr. White is known best, perhaps, as an active politician. He was elected to Parliament in the Conservative interest for North Renfrew in 1874 and, with the exception of a brief interval, represented the constituency steadily until 1896. He was chosen Speaker of the House in 1891 and held that position during a parliamentary term, until 1896, in which year he was defeated in the general election. He carried the constituency again in 1904. Mr. White is a member of the Privy Council of Canada, to which he was called in 1897. He is a director of the Pembroke Lumber Company and is prominently identified with many local commercial enterprises. His brother and business partner, Andrew T. White, was also in public life and for some time represented North Renfrew in the Ontario Legislature.

WILLIAM MOHR.

William Mohr, a prominent figure in the early lumber trade of the Ottawa Valley, died at his home in the township of Fitzroy, near Renfrew, Ontario, in May, 1903, in the ninetieth year of his age. His operations were confined to the square timber trade. He took many rafts to Quebec, his transactions sometimes reaching 750,000 cubic feet in a season. He operated on the Quyon, Bonnechere, Petawawa, Du Moine and Madawaska rivers, where year after year he regularly made his trips to the shanties.

BOYD CALDWELL & CO.

The late Boyd Caldwell, of Lanark, Ontario, came to Canada from his native place in Renfrewshire, Scotland, in 1821 with his parents, when only three years of age. For about fifty years he was engaged in the export timber business, but in 1867 became more extensively concerned in the manufacture of woolen goods. Boyd Caldwell died in 1888. The firm of Boyd Caldwell & Co., of which he was the founder, is still extant, having recently been incorporated, with his son, Thomas Boyd Caldwell, as president. In addition to its extensive woolen mills the company operates a large planing and sawmill.

GILMOUR & CO.

Allan Gilmour, a member of a family that in the early days was extensively engaged in the square timber trade and is today prominently represented in lumber manufacturing, was born in Lanarkshire, Scotland, August 23, 1816. In his early youth he went to Montreal, where

he entered the employ of William Ritchie & Co., wholesale merchants. In 1840 he and his cousins, James, John and David Gilmour, assumed the business. Shortly afterward they engaged in the production of square timber for the Quebec market, and in 1853 Allan Gilmour took up his residence in Ottawa, which became the headquarters of Gilmour & Co. The firm acquired large sawmills on the Gatineau, Blanche and North Nation rivers, tributaries of the Ottawa, as well as steam mills at Trenton, on the Bay of Quinté. Allan Gilmour retired from business in 1873 and died in 1895.

THE COOKS.

George J. Cook, of the Cook & Bro. Lumber Company, was a brother of Herman H. Cook and was born August 22, 1824, in Williamsburg Township, Dundas County, Ontario. He was all his life actively engaged in the lumber business. His first operations, early in the '40's, were on the Nation River, from which they were transferred to Belleville and subsequently farther west. He was one of the first lumbermen to take out board pine in the country lying between Toronto and Barrie. The later operations of the company under his management have been in the Algoma district, where it owns extensive limits. Mr. Cook died August 21, 1902, and was succeeded as president of the company by his nephew, George W. Cook.

H. H. Cook is a son of George Cook. He built a mill at Midland, Ontario, in 1872, and during the next ten years built six others in various localities. Mr. Cook is at the head of the Ontario Lumber Company, of Toronto, and owns extensive limits on the French and Vermillion rivers.

THOMAS COLE.

The death of Thomas Cole, of Westboro, Ontario, in 1904, removed one of the pioneer lumbermen of the Ottawa Valley. Mr. Cole was born in Devonshire, England, in 1820. He went to Canada when still young, and was attracted to the lumber business, first locating at Papi-neauville, Quebec, taking out square timber. Some years later he became a partner of the late James MacLaren, of Buckingham, Quebec, J. C. Edwards and Daniel Cameron in a firm which acquired the Gilmour timber and sawmill interests on the Nation River. The firm did business at the North Nation mills until 1878, when, through the death of Mr. Cameron, the firm wound up its affairs. Mr. Cole left a wife, four sons and five daughters.

THE M'LACHLIN FAMILY.

The founder of the large lumbering business now carried on by McLachlin Bros. at Arnprior, Renfrew County, Ontario, was Daniel McLachlin, one of the pioneer lumbermen of the Ottawa Valley, who established it over sixty years ago. He was an important factor in the public and commercial life of his day and represented his constituency in the Canadian Parliament.

In 1853 Daniel McLachlin purchased the water powers at the mouth of the Madawaska River and the land on which the town of Arnprior now stands, and in 1857 moved up from Ottawa to Arnprior with his family. In 1866 he erected the first sawmill in that place to saw lumber for the American market. In 1869 he retired from business, leaving the work to be carried on by his three sons, Hugh, Frederick and Claude, under the style of McLachlin Bros. He died in 1872.

During the last quarter of a century McLachlin Bros. have cut an average of 60,000,000 feet per annum. The firm has operated for years on the Madawaska, Bonnechere, Petawawa, Kippewa and Black rivers and other tributaries of the Ottawa River, at present furnishing employment to about a thousand men.

Claude McLachlin died in New York April 19, 1903. He was the youngest son of Daniel McLachlin and was born at Ottawa in 1854.

THE CHARLTON BROTHERS.

Among the Canadian lumbermen who during the last generation or so have risen to prominence in public life, John Charlton, of Lynedoch, Norfolk County, Ontario, is easily foremost. Mr. Charlton, though an American by birth, is of British parentage. He was born in New York State, February 3, 1829, and went with his family to Canada in 1849. He established himself at Lynedoch and engaged extensively in lumbering operations.

Always keenly interested in social and political questions and a strong Liberal of the old school by conviction, he took an active part in politics and in 1872 was elected to the House of Commons for North Norfolk, a seat which he retained throughout all political vicissitudes until the last general election in 1904, when his failing health compelled his retirement from politics. Though a keen partisan, he held decided views of his own on many questions. He is the author of a measure usually known as the "Charlton Act for the Protection of Girls," and devoted much attention to the advocacy of commercial reciprocity between Canada and the United States. He was appointed by the British

government a member of the Joint High Commission which met at Quebec in 1898 to arrange disputes and remove obstacles to trade between the two countries. A volume of Mr. Charlton's speeches and addresses on various topics has been published.

Hon. William Charlton, brother of John Charlton, is a native of Cattaraugus County, New York. His earlier years were spent in Iowa, but in 1861 he made his home at Lynedoch, Ontario, and engaged in lumbering and mercantile business. He attained a leading position in the locality and took a prominent part in politics on the Liberal side. He was elected to the Provincial Legislature of Ontario, for South Norfolk, in 1891 and reelected in several following contests. His thorough knowledge of the lumbering industry and the conditions prevailing in the backwoods contributed greatly to his usefulness as a legislator. In 1902 he was chosen Speaker of the House, occupying the position until the defeat of his party in the general elections of 1904. Mr. Charlton is a member of the firm of Pitts & Charlton, of Toronto.

WILLIAM MACKEY.

William Mackey was a prominent figure for over a half century in the lumbering trade of the Ottawa Valley. He came to Ottawa, then Bytown, from his native country of Ireland in 1842 and secured employment in the construction of the first government slide built at the Chaudiere, and was subsequently engaged in improvement work and lumbering on the Upper Ottawa under Hon. James Skead. In 1850 he went into business on his own account and about this time formed a partnership with Neil Robertson which lasted for twenty years and was terminated by Mr. Robertson's death. Their early operations were conducted in the Madawaska country at a time when the square timber trade was at its height. They made money rapidly until the depression set in. In addition to the square timber operations they had a sawmill on a limit at Amable du Ford. When they experienced some reverses Mr. Robertson wished to withdraw from milling operations and to give up his share in the limit as an unprofitable venture. Mr. Mackey's faith in the future of the industry, however, was unshaken, and he relieved his partner of any obligation as to this feature of their business and secured the entire control of the Amable du Ford limit. After the market recovered he took from the limit annually large quantities of timber and eventually disposed of it for \$65,000. Mr. Mackey retired from active business in 1902 and sold out his limits and other lumbering property to J. R. Booth for \$655,000. He died a few months afterward.

H. L. LOVERING.

H. L. Lovering, of Coldwater, Ontario, of English birth, began lumbering in October, 1850, on the present site of Port Severn, at the mouth of the Severn River. In 1852 he located at the head of Lake Superior and cut the first board manufactured on the site of the present cities of Duluth and Superior. In 1857, having returned to Ontario, he associated himself with A. R. Christie, of Port Severn. Since 1870 he has been with the Georgian Bay Lumber Company.

JOHN R. BOOTH.

John R. Booth, of Ottawa, Ontario, went there in 1852 and leased a small mill. He now owns about 4,250 square miles of timber limits—sufficient timber land to make a strip a mile wide reaching across Canada from the Atlantic to the Pacific. In one of his mills 600,000 feet of lumber is produced daily and between 1,500 and 1,600 men are given employment directly or indirectly.

Mr. Booth built the Canada Atlantic and the Ottawa, Arnprior & Parry Sound railways, with 400 miles of main line and 100 miles of siding. He also founded a line of steamers, built car shops and created other extensive interests. In 1904 he erected a pulp mill at the Chaudiere. Mr. Booth has also a distributing yard and planing mill at Burlington, Vermont.

ALEXANDER FRASER.

Alexander Fraser, of Ottawa, one of the leaders of the square timber trade, was the son of Hugh Fraser, a Highlander who served in the War of 1812 and afterward settled at a point near Ottawa, where Alexander was born in 1830. He embarked in the lumbering industry and in 1853 took out his first raft of square timber on Black River. His career was successful from the start, and his operations rapidly increased until during the '70's he had frequently a dozen or so rafts simultaneously on the way to market. He was known from the headwaters of the Ottawa to Quebec. He was a man of great energy and determination of character, was possessed of a keen foresight and sound business judgment and often by tacit consent was accorded a leading part in the management of large enterprises in which he was interested. He was one of the founders of the Bank of Ottawa, the Lachine Rapids Hydraulic Company and the Ottawa Trust & Deposit Company and was also heavily interested in the Upper Ottawa Improvement Company and the Keewatin Lumber Company.

Mr. Fraser sustained great reverses from time to time, but his

strong financial standing enabled him to bear them easily. In 1895, upon his retirement from active business, his sons, J. B. and W. H. A. Fraser, organized the Fraser Lumber Company. Mr. Fraser died June 1, 1903, aged seventy-three years.

HON. ERSKINE H. BRONSON.

Hon. Erskine Henry Bronson, of Ottawa, was born at Bolton, New York, in 1844. His father, Henry Franklin Bronson, moved to Ottawa, then Bytown, in 1853, and built on Victoria Island, in the Ottawa River, the first sawmill which shipped lumber from Ottawa to the American market. The venture prospered and grew and many fortunes were made in the trade. At the age of twenty-one the younger Bronson entered his father's business, familiarizing himself with all of its details. In 1867 he was given an interest in the business, which was afterward incorporated as the Bronson-Weston Lumber Company. The cut for twenty years averaged 50,000,000 feet of lumber annually and one season it amounted to 85,000,000. The mill went out of operation in 1898, but the company still owns large areas of timber lands. Mr. Bronson is president of several industrial companies. He represented Ottawa in the Provincial Legislature of Ontario between 1886 and 1898, and for some years was a member of the Liberal administration.

ROBERT STEWART.

Robert Stewart, of Guelph, Ontario, located there in 1855, and is now the owner of one of the largest plants in Ontario manufacturing sash, doors and trim.

THE M'ARTHUR BROS. CO., LIMITED.

This concern was composed originally of John, Alexander and Peter McArthur, of whom only the latter survives. For nearly a half century they conducted a manufacturing business in board pine, in western Canada and Michigan. Their head office was in Toronto, with branches in Montreal and Quebec. They held valuable timber limits in various parts of Canada, and still have important interests in this respect, as well as others in gold, silver, lead and copper, both in Canada and in the United States. The firm still manufactures timber for the Quebec market, its product being handled by The McArthur Export Company, in Quebec City. Its specialty, board pine, has been always recognized as superior and is well known in all consuming countries.

The eldest brother of the family, Archibald McArthur, with his sons, is engaged, in a limited way, in the manufacture of mixed varieties of

square timber for the Quebec market, at Lancaster, Glengarry County, Ontario, where the Canadian branch of the family originated.

Under the name of The McArthur Bros. Co., Limited, Peter McArthur conducts a large enterprise in lumber in Detroit, Michigan.

THE RATHBUN COMPANY.

Edward Wilkes Rathbun, late president of the Rathbun Company, of Deseronto, Ontario, was born in 1842 at Auburn, New York. During his youth his father, Hugo B. Rathbun, left the United States to engage in the lumbering industry in eastern Ontario. He started a small sawmill at Mill Point, now the town of Deseronto, on the Bay of Quinté.

E. W. Rathbun, after having received a first-class business training in New York, joined his father. The industry soon attained large proportions and expanded in many directions. In 1884 it was incorporated as the Rathbun Company, with E. W. Rathbun as president. The company established sawmill plants at Gravenhurst, Lindsay, Campbellford, Tweed, Bancroft, Fenelon Falls and Manitoulin Island. Other branches of industry were added and operated from time to time as auxiliaries, either by the Rathbun Company or other corporations closely affiliated with it and controlled by Mr. Rathbun. These included a sash and door factory doing a very large export trade, charcoal kilns to utilize the by-products of lumbering, cement works, etc. The Rathbun Company is also in the lumber and coal carrying trade, owns a dry dock and ship yard and has extensive car shops. The stockholders are proprietors of the Bay of Quinté railway, eighty-four miles in length. These and other diversified industries aid each other and have built up a flourishing industrial community. The company owns about 350,000 acres of government timber limits in addition to 60,000 acres of timbered land in fee simple.

Mr. Rathbun was a firm believer in the necessity of conserving the forest as a permanent source of supply, and the extensive limits under his control were worked on economical principles with a view to avoiding waste and preserving the younger growth of trees with an eye to future requirements. He had made a close study of the question, and was appointed a member of the Ontario Forestry Commission in 1897, in which capacity he brought his practical experience as a lumberman to bear upon the problems submitted. The report of this body had an important influence upon the policy since pursued by the Government.

Mr. Rathbun, who died November 24, 1903, was a many-sided man

of tireless energy and liberal culture, and took a keen, practical interest in all public questions.

THE HURDMAN FAMILY.

Robert Hurdman, of Ottawa, was the youngest and surviving member of the original Hurdman family, consisting of five brothers, William, Charles, John, George and Robert, who were prominently identified for a half century with the lumber trade of the Ottawa Valley. Their father was Charles Hurdman, who emigrated from Ireland in 1818, and settled in Hull Township.

Robert Hurdman was born in 1830, and in connection with his brothers operated extensively in the square timber trade on the Peta-wawa River, Ontario, their first operations being in 1866. In 1872 limits were purchased in the Kippewa district, and in 1879 they began to get out logs on contract for the mill owners, in the same year forming the partnership of Sherman, Lord & Hurdman. The firm operated the old Crannell mill in the Chaudiere district, the logs being cut by the Hurdmans on their limits. A limit was also purchased that year in the Coulonge district. Several changes and reorganizations in the personnel and style of the partnership subsequently took place. In 1886 the name was R. Hurdman & Co., Mr. Hurdman acting as manager of the mills. The concern afterward embraced other interests and in 1891 became the Buell, Orr, Hurdman Company. Mr. Hurdman, however, had large lumbering interests outside of the company's operations and dealt extensively in timber limits, accumulating considerable wealth. He entered into partnership with the Shepard & Morse Lumber Company, of Boston, to operate his limit in the Kippewa district. After the dissolution of this partnership he purchased limits from the Bronson Company, at Deep River, which he sold to Fraser & Co. A few years ago Mr. Hurdman bought from R. H. Flock & Co. the limits at Ross Lake in the Kippewa district which he operated with the help of his son until the time of his death. He died May 4, 1904, aged seventy-four years.

HON. WILLIAM C. EDWARDS.

Hon. William C. Edwards, of Ottawa, is the son of William Edwards, who came from England to Canada in 1820 and settled in Clarence Township, Russell County, Ontario, where Senator Edwards was born May 7, 1844. He established in 1868 the firm of W. C. Edwards & Co., the transactions of which have been large and successful. In addition to his lumber interests Mr. Edwards devotes a good deal of

attention to stock raising and agriculture. Entering the political field as a Liberal, he was elected to the House of Commons in 1887, and in 1903 was appointed a member of the Senate.

ROBERT LAIDLAW.

Robert Laidlaw, of Toronto, has always been identified with the lumber industry, and in 1871, in partnership with Thomas Shortreed, purchased some timber in Barrie Township, Simcoe County, Ontario, where he operated until the timber was exhausted. In 1886 Mr. Laidlaw established wholesale and retail yards at Sarnia, Ontario, and Buffalo, New York. He is also a member of the R. T. Jones Lumber Company of North Tonawanda, New York.

GILLIES BROTHERS.

The business of Gillies Bros. Company, Limited, was founded in 1873, by James, William, John and David Gillies, sons of the late John Gillies, who at one time carried on extensive lumbering operations at Carleton Place, Ontario, in partnership with Peter MacLaren. The Gillies brothers bought a sawmill plant at Braeside, Ontario, which has been enlarged and improved until at the present time they manufacture about 40,000,000 feet of lumber yearly, in addition to their output of shingles, lath, etc., giving employment to about a thousand men in the mills and the bush. They hold about one thousand miles of timber limits, partly in Ontario and partly in Quebec, on the Coulonge, Peta-wawa and Montreal rivers and Lake Temiscamingue. For the last thirty-five years the greater portion of their output has found a market in the United States. James Gillies is president of the company and is also head of the John Gillies Estate Company, manufacturer of gasoline launches and sawmill machinery at Carleton Place.

GEORGE M'CORMACK.

George McCormack, of Orillia, Ontario, was born October 12, 1850, at Lochaber, Ottawa County, Quebec, of Irish and Scotch descent. Having in his youth acquired a thorough knowledge of the lumber trade in the Ottawa Valley, he transferred his operations to the then little known region of Parry Sound, which offered a promising field. He displayed much foresight and energy, and his trade rapidly extended. For many years he was in partnership with the late Angus McLeod under the name of McCormack & McLeod until the death of the latter in 1903. In addition to his operations in northwestern Ontario, Mr. McCormack has large interests in the lumber trade of British Columbia. He is a Conservative in politics and takes an active part in

public life. He entered the House of Commons in 1896 as representative of the Muskoka and Parry Sound district and was a member during two terms.

GEORGE H. PERLEY.

George H. Perley, of Ottawa, is the son of William G. Perley, one of the pioneer lumbermen of the Ottawa Valley. His native place is Lebanon, New Hampshire, and the date of his birth September 12, 1857. His business career began with his admission to the firm of Perley & Pattee, of which his father was the senior partner. At present he is head of the firm of G. H. Perley & Co., vice president of the Hull Lumber Company, and is also actively concerned in other industrial undertakings.

Mr. Perley is a public-spirited citizen and has taken an active part in charitable enterprises. He was chairman of the relief fund which distributed nearly a million dollars to the sufferers of the Ottawa fire in 1900. In politics he is a Conservative and on three occasions was nominated as candidate of that party for the House of Commons, being returned in 1904 as member for Argenteuil, Quebec.

JOHN B. MILLER.

John B. Miller, of Toronto, president of the Parry Sound Lumber Company, is a native of Athens, Leeds County, Ontario, and was born July 26, 1862. His father was John Clausin Miller, at one time Superintendent of Woods and Forests for Ontario, and subsequently a lumber operator. At an early age Mr. Miller was associated in the business with his father, upon the death of whom in 1884 he succeeded to the presidency of the Parry Sound Lumber Company, which does a very extensive business. He is also largely interested in manufacturing, being joint owner of the Polson Iron Works, of Toronto, and is a prominent figure in the commercial life of the city. In February, 1905, he was elected president of the Lumbermen's Association of Ontario.

JOHN BERTRAM.

On November 28, 1904, Canada lost one of its foremost citizens in the person of John Bertram, who died from an operation for appendicitis at his home in Toronto. He was a man of splendid business ability and sterling integrity. Though prominent in many other spheres of activity he was, perhaps, more closely identified with the lumber industry than with any other. He was a Scotchman by birth, and arrived in Canada in 1860 when twenty-three years of age, settling at Peterboro, Ontario, where he engaged in the hardware trade. He moved to

Toronto in 1878, embarking in the wholesale branch of the business. About this time he began extensive lumbering operations in connection with the Collins Inlet Lumber Company, of which he was president, having large limits on the Georgian Bay with sawmills at Collins Inlet.

He was eminently successful as an operator, and was a noted advocate of forest preservation. His own operations were conducted on economical principles with an eye to the future productiveness of his limits, and utilized to the best possible advantage not only the pine but the hardwood growth. Owing to his practical knowledge of forest conditions, of which he had made a life study, in 1897 he was appointed a member of the Ontario Forestry Commission to report on the subject of restoring and preserving the growth of white pine and other timber trees upon lands in the Province which are not adapted to agricultural purposes or to settlement. The valuable report of this commission practically inaugurated a new era in forest administration. Its recommendations were adopted by the Government, and a large area of land was added to the forest reserves. He was an active and valued member of the Canadian Forestry Association and the author of several masterly papers on forestry subjects.

Mr. Bertram was largely interested in the Bertram Engine Works Company, of Toronto, of which he became president in 1900. His last field of public usefulness was as chairman of the Dominion Transportation Commission. He was appointed to that office October 27, 1903. Under his leadership the commission had collected much valuable information, when ill health terminated his tenure of office. A widow and a family of seven survive him.

NATHANIEL DYMENT.

A lumber operator since the time of his youth is Nathaniel Dymont, of Barrie, Ontario. His first operations were in Ancaster and Beverly townships, Wentworth County, and subsequently he built a number of mills on the Great Western railway. In 1886 the firm of Mickle, Dymont & Son was organized, with mills at Gravenhurst, Severn Bridge and Thessalon, Ontario, with an annual output of 35,000,000 feet.

ELIHU STEWART.

Elihu Stewart, Superintendent of Forestry for Canada, was born in Sombra, Lambton County, Ontario, November 17, 1844. He was admitted as a Dominion land surveyor in 1872, and was extensively engaged in Crown surveys both in Ontario and the Northwest Territories. He resided for some time in the town of Collingwood and took

an active part in municipal and political affairs. He was elected mayor of the town in 1896, and during the same year unsuccessfully contested North Simcoe in the interest of the Liberal party.

In 1899 he was appointed Superintendent of Forestry, owing to his wide knowledge of the requirements of the Northwest, where extensive operations in tree planting have since been carried on under his direction with the best results. Since the work has been undertaken its scope has been greatly increased. During the years 1901-1904 upward of 3,200,000 trees, distributed by the Government, have been planted by the farmers in the prairie country. Over half of these trees were set out in 1904.

AUBREY WHITE.

Aubrey White, Assistant Minister of Lands and Mines for Ontario, was born at Lisonally House, Tyrone County, Ireland, March 19, 1845, and received his education in that country. He came to Canada in 1862, and for some years was engaged in the lumber business in the Muskoka district. In 1876 he entered the service of the Government as a forest ranger and some years later was appointed clerk of the Woods and Forests Branch. Recommendations made by him to the Provincial government resulted in the adoption of the fire-ranging system, which was established in 1885, and, having subsequently been greatly extended, has done much to check the ravages of forest fires.

In 1887 Mr. White was advanced to the post which he now holds in what was then known as the Department of Crown Lands. During successive administrations he has taken a prominent part in the shaping and carrying out of their timber policies and the effecting of such changes in the regulations as were rendered necessary by the development of the Province. Mr. White is a leading Free Mason and a prominent member of the Canadian Forestry Association.

THOMAS SOUTHWORTH.

Thomas Southworth, director of Forestry and Colonization for Ontario, was born in Leeds County, Ontario, in 1855, of American parentage, and is a direct descendant of one of the Pilgrims who came over in the *Mayflower*. He was for many years engaged in journalism as editor and manager of the *Brockville Recorder*. In 1895 he was appointed Clerk of Forestry. Previous to his appointment the duties of the position had been merely of an educational and advisory character, but, owing to the growing urgency of the question, the scope of the office was greatly enlarged and it was put upon a practical basis in con-

nection with administrative work. To the investigations undertaken by Mr. Southworth, and the data and suggestions presented by the Bureau to the Government, the establishment of the system of extensive forest reserves in the wooded regions of New Ontario is mainly due. Mr. Southworth was a member of the Royal Commission which in 1897 reported on the subject in favor of the setting apart of forest reserves. Latterly he has been entrusted with the direction of colonization movements in the newer parts of the Province.

CHAPTER XVIII.

NEW BRUNSWICK—TIMBER HISTORY.

Although the landing of DeMonts, the French pioneer, in the present harbor of St. John, New Brunswick, June 24, 1604, is annually celebrated in the Canadian Province, the progressive history of New Brunswick dates from the time of the influx of loyalists from the United States in 1783. They were known as the United Empire Loyalists; and, so great was their love for their King and royal traditions, they left the United States after the successful issue of the Revolution again to find a home under British rule on the American continent.

On their arrival at St. John they found a country covered with pine, spruce, fir and hardwoods, and almost unscarred by the ax. They found the River St. John and other streams penetrating, with their tributaries, this magnificent timber. The River St. John, it is true, rises in Maine, but the greater part of its channel lies within the present Province of New Brunswick. Another portion of the stream forms the boundary between the New America to which the loyalists had come and the old new America which they had left. They recognized the importance and value of the St. John as a waterway, and even to this day it brings to the City of St. John large numbers of logs from both Maine and New Brunswick.

The Province of New Brunswick embraces 27,985 square miles. The principal timber territory is traversed by the Tobique and smaller streams which empty into the St. John, the Miramichi, the Nepisiguit and the Restigouche. These are the principal log-floating streams in New Brunswick. The Province contains 17,910,400 acres, of which about 7,500,000 acres remain in the hands of the Crown and may be considered timber lands. Of these about six million acres are under license to lumber operators and many have been denuded of the more valuable and larger timber, though still capable of being profitably operated. The remainder of the Crown lands, about 1,500,000 acres not under license, is in the interior of the Province and is almost in its pristine condition. In addition to the timber on the public lands, there is much valuable timber on lands held by private owners. In particular the 1,647,772 acres granted to the New Brunswick railway as a bonus

includes some of the finest timber land in the Province, stretching from the southwest Miramichi waters across the Tobique Valley to the head waters of the Restigouche. It is leased by the company to lumber operators and yields a large annual cut. Alexander Gibson, one of the largest operators, owns 200,000 acres of forest land and other individuals hold the fee simple of extensive tracts, so that the total area of forest land is at least ten million acres. Some authorities put the figure considerably higher; Lieutenant Governor Jabez B. Snowball, an expert in the lumber trade, estimates the total forest area at about twelve million acres, but as this apparently includes large tracts which have been stripped of timber by fire and by the ax, the former estimate probably includes all the land at present available for lumbering operations.

Spruce is the predominant tree and, although wherever operations have been carried on the heavier spruce is pretty well cleared off, there is still an abundance of ordinary sized trees. The merchantable pine is nearly exhausted, but in many localities a flourishing young growth is springing up which, if protected against fire, will form a valuable future source of supply. Along the north shore there is a belt of hardwood comprising oak, beech and maple. Of the total forest area 60 percent is estimated to be spruce land, 10 percent pine, 5 percent hemlock, 5 percent cedar and 20 percent hardwoods, which latter consist principally of birch, beech, ash and maple.

The original timber growth of the Province was white pine and red pine principally, but the proportion of these woods has been much reduced by cutting. Spruce is now the principal article of local manufacture and foreign export and owing to its availability and rapid growth it enjoys a favor equal to, if not greater, than that of pine. White spruce and black spruce predominate and smaller quantities of red spruce, hemlock, balsam, fir and white cedar are also present. Among the hardwoods are the red, yellow and white birches, the hard and soft maples, ash, white, red or black, beech and American elm, generally distributed, and butternut and basswood in the southern part of the Province. Red birch and yellow birch form the greatest hardwood wealth and much white birch is cut for spool stock.

New Brunswick has from the earliest days been a great lumbering section, the industry being favored by the geographical position of the Province and its physical conformation, which presents special facilities for the shipping and marketing of its forest product. It is surrounded

on the southeast and partly on the north by water, giving a seaboard of 545 miles. There are two great river systems, the St. John and the Miramichi, with another important one, the Restigouche, and numerous smaller rivers which, with lakes, intersect the Province in every direction, affording abundant facilities for floating timber from the interior to the coast. In addition to these natural highways New Brunswick claims to have a larger railway mileage in proportion to population than any other country.

As early as 1778 the magnificent timber on the St. John River attracted British enterprise and capital. In 1781 Jonathan Leavitt launched at St. John the pioneer vessel of the fleet of New Brunswick built ships which subsequently sailed from that port.

The territory was at that time a portion of the Province of Nova Scotia. It was set apart as a separate province in 1785. Up to that time it was but sparsely settled, the population being composed mainly of a few Acadians and some straggling settlers from New England attracted by the profits promised by the timber or the fish trade. But the population was being increased by an influx of United Empire Loyalists who had taken the side of Britain during the Revolutionary War and felt compelled in consequence to seek homes outside of the United States. European immigrants also came in large numbers, the principal attraction being the opportunities afforded by the growing timber industry, which was greatly increased by the demands of the British navy. The ships which left New Brunswick with cargoes of timber returned laden with immigrants, many of whom passed on to the United States. Those who remained in the Province and took up land, however, were greatly aided financially by the market afforded for their produce by the lumberman and the timber merchant.

W. O. Raymond, LL. D., writing in the *St. John Telegraph* on "Early History of New Brunswick Families," says concerning the first sawmill in New Brunswick:

"The reference to a mill, built by the brothers Louis and Mathieu d'Amours in the neighborhood of Fort Nashwaak, may serve to explain the statement of Villebon in 1696, that he had caused planks for madriers, or gun platforms, to be made near the fort. This mill at any rate antedates by the best part of a century the mill built by Simonds & White at St. John in 1767 and that built by Colonel Beamsley Glasier's millwrights at the Nashwaak in 1768. Doubtless it was a very primitive affair, but it sawed lumber, and was in its modest way the pioneer of

the greatest manufacturing industry of New Brunswick at the present day."

In 1790 there were two sawmills of a primitive design in St. John. In 1822 a steam engine and boiler were imported from Birmingham and the first steam sawmill was started, the first output being shipped the same year to Cork, Ireland. Thereafter the number of sawmills increased rapidly and the item of sawn lumber began to assume a prominent position in the table of exports.

The noted Miramichi forest fire occurred in 1825. It had been a summer almost without rain and, when autumn came, the woods were as dry as tinder. Fires from numerous causes originated in many places in the forest and columns of smoke enshrouded the earth in the darkness of twilight. The danger did not become great, however, so long as the air was still. On the night of October 7, 1825, a strong wind arose and fanned the flames into fury. A local historian has thus described it:

At eight o'clock the wind increased to a swift hurricane from the west and soon afterwards a loud and appalling roar was heard, with explosions and a crackling like that of discharges of musketry. The air was filled with pieces of burning wood and cinders, which were driven along by the gale, igniting everything upon which they fell. The roaring grew louder and sheets of flame seemed to pierce the sky. The people ran hither and thither, some gave up in despair, some took refuge in the river, domestic and wild animals mingled in the general rush for safety. In the space of a single hour the fire swept over the district north of the river, destroying everything in its path. The sweep of the fire in northern New Brunswick extended for one hundred miles and covered an area of 6,000 square miles.

The crowning catastrophe came when the conflagration swept away within an hour Newcastle, Douglastown and other villages on the northern side of the Miramichi River. Of five hundred buildings only twenty-five remained, and the ships in the harbor were burned.

The fire was not confined to this district. It devastated the whole country from the Bartibogue to the Nashwaak, a distance of more than one hundred miles, and crossed the upper Tobique Mountains one hundred miles distant in another direction. The total area laid waste was about six thousand square miles and the loss of timber at the low estimate then placed upon it was reckoned at £500,000. The effects of this disastrous fire were seriously felt by the trade for many years afterward.

EARLY LUMBERING METHODS.

The following description of the methods of lumber manufacture employed at an early period, taken from the "Account of the Province

of New Brunswick by Thomas Baillie, Esq.," in 1832, will be of interest. Mr. Baillie was surveyor general. The work was written mainly for the benefit of future immigrants.

Mills for sawing lumber are our principal and largest branches of industry. The proper dimensions of the building are sixty feet long, forty feet broad and about twenty feet in height to the roof. The usual expense of the whole undertaking, including the dam, is seldom less than £1,000, provided the river be large. In this country, wood and water being so abundant, steam and iron are not likely to prove profitable when the former materials can be used.

Labor is so exceedingly high that mills are constructed in a very simple manner, substituting great power for complicated machinery, and no fault could possibly be found with such an economical arrangement, provided the power remained at its usual maximum. But during the summer months and in the depth of winter the water, which is generally so abundant, becomes so much reduced in quantity and the machinery is then in want of sufficient power to continue in operation. The simplicity of the machinery and its being made of wood admit, in the scarcity of millwrights, of the repairs being at any time effected by the millers themselves, at which they are exceedingly expert. The difficulty attending iron machinery in the event of accidents would be irreparable, for, considering the remote situations of mills, an engineer could not possibly be obtained in sufficient time to prevent delay.

Sawmills are worked with undershot water wheels, carrying a crank to which is applied a connecting rod giving motion to the saw. One saw in a frame is universally considered more advantageous than gangs, owing to the acceleration of the motion. The part of the machinery which causes the log to advance to the saw and to carry it back is equally simple and prodigal of water. . . .

The sawmills manufacture boards one inch thick from the white pine, the spruce and the hemlock for the consumption of the Province, and the former article also for the West Indies. Heretofore they have been principally employed in the sawing of deals from the white and red pine and a few from spruce for the British market, but the latter trade has sustained so severe a shock from the low state of the home market that the mills would have gone to decay had not the West Indies at one period held out some inducement to manufacture boards. The raw material is obtained from the Crown lands under a license for which a duty of two shillings and six pence for every thousand superficial feet of one inch in thickness is paid to the Crown.

The writer proceeds to show how the sawmills have always been the pioneers of settlement and gives the rate of wages prevailing at that period as follows: For first-class millmen, £6 per month; second class, £4 10s; laborers, £3 to £4 10s. Men in the woods received £4 per month with board. "With charges so heavy as these," concludes Thomas Baillie, Esq., "it is perfectly impossible for our mill owners to compete with the Americans." Nevertheless, as the figures previously quoted show, the trade continued to flourish as the depression in the British market passed away and the demand from that quarter again became active.

Shipbuilding formed at this time an important industry. In the earlier days many of the vessels built in the Province were defective, being built by contract for from £4 to £7 per ton. In 1840 an effort was made with some success to improve the standard by a rigid system of inspection. For many years the abundance and good quality of timber gave New Brunswick a notable advantage in shipbuilding.

In the early days of the Nineteenth Century many people were disposed to regard the lumbering industry somewhat unfavorably, as an obstacle to the agricultural development of the country and as a frequent cause of demoralization to the men engaged in it. Complaints of this sort are frequently met with in the descriptive works of the writers of the period. Joseph Bouchette, surveyor general of Lower Canada, in a work dealing with the British American colonies, published in 1832, in speaking of the northern region of the Province, says:

"The quantities of timber that have been felled, squared and taken from this part of the country are enormous and yet no one industry presents so few symptoms of improvement. The pursuit of lumbering (perhaps a necessary evil in colonizing a wilderness) seems indeed of a demoralizing tendency, sometimes depriving its followers of the inclination and even capability for consistent and steady industry."

Another writer, J. McGregor, in his "Historical and Descriptive Sketches of the Maritime Colonies of British America," published in 1828, gives a very vivid description of the hardships and discomforts of a lumberer's life and the primitive camp arrangements then in vogue:

They commence by clearing away a few of the surrounding trees and building a camp of round logs, the walls of which are seldom more than four or five feet high, the roof covered with birch bark or boards. A pit is dug under the camp to preserve anything liable to injury from the frost. The fire is either at the middle or at one end, the smoke goes out through the roof, hay, straw or fir branches are spread across the whole breadth of the habitation, on which they all lie down together at night to sleep with their feet next the fire. When the fire gets low he who first awakes or feels himself cold, springs up and throws on five or six billets and in this way they manage to have a large fire all night. One person is hired as cook, whose duty it is to have breakfast ready before daylight, at which all the party arise, when each man takes his "morning," or the indispensable dram of raw rum, before breakfast. The meal consists of bread, or occasionally potatoes, with boiled beef, pork or fish and tea sweetened with molasses. Dinner is usually the same, with pea soup instead of tea, and the supper resembles the breakfast. These men are enormous eaters and they also drink great quantities of rum, which they scarcely ever dilute.

After describing the rafting of timber down stream in the spring, and its attendant hardships, the writer goes on to say :

No course of life can undermine the constitution more than that of a lumberer or raftsman. The winter snow and frost, although severe, are nothing to endure in comparison with the extreme cold of the snow water of the freshets in which the lumberer is day after day wet up to the middle and often immersed from head to foot. To stimulate the organs in order to sustain the cold these men swallow immoderate quantities of ardent spirits and habits of drunkenness are the usual consequence. Their moral character with few exceptions, is dishonest and worthless. Premature old age and shortness of days form the inevitable fate of a lumberer. After settling and delivering up their rafts, they pass some weeks in indulgence, drinking, smoking and dashing off in a long coat, flashy waistcoat and trousers, Wellington or Hessian boots, a handkerchief of many colors round the neck, a watch with a long chain and numberless brass seals and an umbrella.

The picture is a strong one, and that there were exceptions to the rule of profligacy and that the sad fate of the lumberer was not inevitable, the author a little further on admits in giving instances of young men who, by saving their earnings in lumbering on the Miramichi, were enabled to purchase farms, or became principals in the lumber business.

CHAPTER XIX.

NEW BRUNSWICK—FOREST LEGISLATION.

As in the other provinces of Canada, so it was in New Brunswick—the home Government early sought to regulate the timber wealth. England always thought much of her naval greatness and sought to assure in her North American colonies a sufficient supply of white pine for masting for her ships. Thomas Baillie was appointed surveyor general in 1824, receiving the following explicit instructions:

Whereas we have been graciously pleased to give instructions unto our right trusty and right entirely well-beloved cousin and counsellor, George, Earl of Dalhousie, Captain General and Governor-in-Chief in and for our Province of New Brunswick in America, for the regulation of his conduct in granting lands to our loyal refugees, who have taken refuge in that Province, and others who may become settlers therein, and amongst other things to signify our will and pleasure that no grant whatever be made of lands within our said Province until our Surveyor-General of the Woods, or his Deputy lawfully appointed shall have viewed and marked out such districts within our said Province as reservations to Us, our Heirs and Successors, as shall be found to contain any considerable growth of masting, or other timber fitting for the use of our Royal Navy; and that our Surveyor-General of Lands in our said Province shall not certify any plots of lands ordered and surveyed for any person or persons whatsoever, in order that grants may be made out for the same until it shall appear unto him by a certificate under the hand of our Surveyor-General of the Woods, or his Deputy, that the land so to be granted is not part of or included within any district marked out as a reservation for Us, our Heirs and Successors, as aforesaid for the purpose before mentioned.

It is therefore our will and pleasure that and you are hereby authorised and empowered to give license in writing to any of our subjects in our Province of New Brunswick, to cut down such white pine and other trees growing upon the waste land which you shall judge to be not proper for the use of our Royal Navy.

INVESTIGATION OF 1833.

In 1827 the sale of limits by auction instead of by fixed fees was instituted, any purchase to be limited to a maximum of 1,200 acres to one person. Subsequent regulations in 1829 ordered a survey before sale and sought to prevent unnecessary waste in the cutting of timber. The receipts from timber limits in 1831 were £10,820. Joseph Cunard had been granted in 1831 a reservation for ten years on the Nepisiguit River above the falls on condition that he would improve the waterfall and secure a license to cut one thousand tons of timber per annum.

This arrangement created criticism and, together with other complaints, brought about an investigation of timber administration, and a committee of the legislative assembly was appointed in 1833 to make an investigation. At this investigation it appeared that it was the custom to receive from April of one year to May 1 of the following year applications for timber berths from all persons indiscriminately, so long as they were accompanied by a fee of forty-five shillings. On the latter date the applicants were notified whether their applications had been accepted or rejected. If there were two or more applicants for one piece of land all were rejected but one and the lucky man was given three months in which to pay the dues, amounting to 1s per ton for white pine and 1s 3d for red pine. In addition there was a tax of 3d per ton for expenses of survey. Mill reserves might be obtained by the same method, but in 1833 a new regulation made it necessary to secure these mill sites by public auction.

In 1837 the home Government assigned to the Provincial government the regulation of Crown lands and the enjoyment of revenues therefrom. New regulations were adopted providing for five-year licenses and dues of 2s on white pine and 2s 6d on red pine.

The average cut of New Brunswick for the years 1835, 1836 and 1837 was 116,600 tons of timber (16,820,000 feet of lumber) and the dues were £16,416. The average annual export of pine and birch timber during the same period was 249,926 tons, of masts and spars 619 and of deals 73,250,423 feet.

The following table showing the growth of the industry is given in Dr. Abraham Gesner's work on New Brunswick, published in London in 1847:

Year.	Sawmills.	Values.	Persons employed.
1831.....	229	£320,000	3,798
1836.....	320	420,000	4,300
1840.....	574	740,000	7,400
1845.....	640	900,000	8,400

The shipments from St. John in 1822 were: Pine timber, 79,122 tons; birch timber, 7,520 tons; masts and spars, 2,147; poles, 383; lath-wood, 10,047 cords; boards, planks and deals, 8,277,000 feet; staves, 2,392,000 pieces; shingles, 2,842,000 pieces; shooks, 268 bunches. In 1832 the exports from St. John of deals, boards and scantling had increased to 22,000,000 feet; in 1842, to 43,000,000 feet, and in 1852, to 186,314,000 feet. Then came reverses followed by a period of depression which lasted several years, but in 1872 the shipments under this head stood at 236,639,000 feet.

During the early '40's the trade in sawn lumber, which had been rapidly increasing while that in square timber had been falling off, began to take the lead in volume and importance. In 1835 the square timber trade was far in advance, the values of the exports of forest products for that year being: Square timber, £291,817; boards, £13,437; deals, £104,150; staves, £12,969. For 1839 the returns of exports from the port of St. John giving quantities as well as values (in returns from other ports quantities are not specified) were as follows: Square timber, 255,647 tons, value £277,998; boards, 6,622,000 feet, £16,641; deals, 75,969,000 feet, £189,252; staves, 1,858,000, £8,318. Six years later the sawn lumber exports considerably exceeded the shipments of square timber, the following being the returns for 1845 from St. John: Square timber, 244,846 tons, £275,451; boards, 10,537,000 feet, £26,342; deals, 127,860,000 feet, £319,650; staves, 1,008,000, £4,536; total, £825,979. The values above given, it may be noted, are in sterling money, the pound sterling being a trifle under \$5. The "pound" of the old Canadian or Halifax currency is equivalent to \$4 and in these old records it is not always clear which is meant.

The contributions of the lumber industry to the public revenue were comparatively insignificant until the middle of the century. The receipts of the Provincial government on account of timber in 1849 were £1,821, omitting fractional currency; in 1850, £2,304; in 1851, £1,851 and in 1852, £5,256 (probably Halifax currency). In 1853 an attempt was made to put the industry on a more conservative basis and to give limit holders a guarantee of permanency of occupation. Previous to that time it appears to have been the practice to submit all the holdings to public competition every year, with the obvious result of encouraging production, each licensee being anxious only to realize as much as possible from a limit that might pass into other hands in a few months. Accordingly the upset price of mileage was advanced from 10 shillings (\$2) to 20 shillings (\$4) per square mile with a proviso for renewal for three years in case as much as \$10 per mile were paid. The report for that year of Surveyor General R. D. Wilmot refers as follows to the change:

Great complaints having been made by those engaged in the lumber trade that the practice of annually putting up all the timber berths to public competition bore injuriously as well on the trade as on the revenue, the expense incurred in building camps, erecting dams, cutting roads and other matters incident to the business being so great that they would prefer paying an increased rate of mileage if they could thereby secure the right of renewal for a longer period than one year. The

Government, in order to meet in some degree the views of the lumbering interest, determined to offer the timber berths at auction at the upset price of 20 shillings per square mile, giving the purchaser who bid it off at 50 shillings or more per mile the right of renewal for three years at the rate it was bid off. Ninety-seven persons, holding $962\frac{1}{2}$ square miles, are accordingly entitled to the privilege of renewal under this regulation.

The receipts from timber that year increased to £8,868.

In 1844 an export duty was laid on logs. In 1867, when New Brunswick entered the Canadian confederation, the export duty was abolished, a special allowance of \$150,000 annually being made by the Dominion government to the Province to compensate it for the loss of revenue. In 1867 the receipts from timber were \$80,882.68, the sum of \$56,415.58 being contributed by export duty. Another important change was made in 1874 when the duties were based on the cut of lumber and licenses were made renewable for two years.

TERM OF LEASES INCREASED.

In 1883 the Government concluded that it was time to call a halt in the policy of alienating large tracts of public lands unfitted for cultivation, sales in fee simple and extensive railway grants having considerably lessened the area capable of producing a revenue from its timber product. It adopted the principle of retaining possession of all the purely timber land remaining, and since then only small and isolated lots of such land, which, by reason of local conditions, could not be advantageously administered by the department, have been sold outright. In the same year it was decided to increase the length of the term for which timber limits could be leased to ten years, with the result that the public revenue again showed a large increase.

The leases issued for ten years expiring in 1893, the Government in 1892 appointed a royal commission to make a full inquiry into the condition of the lumber trade and into the best policy to be adopted in administering the timber lands. The commission was so strongly impressed with the desirability of giving the lumberman a permanent tenure of his holding that it recommended the leasing of the lands in perpetuity. This, however, was going farther than public opinion was prepared to sanction, but the Government proposed by way of compromise—a way most governments have—to grant leases for twenty-five years reserving the right to increase the mileage rate and fix rates of stumpage. The result was that a decision was reached to grant licenses renewable from year to year for twenty-five years, making it possible for a license issued in 1893 to be renewed until August 1, 1918. Under

the present plan the licenses are sold at public auction at \$20 per square mile, with an additional charge of \$8 for renewal. The dues on pine and spruce were fixed at \$1 a thousand feet and in 1904 increased to \$1.25. Ten thousand feet of lumber must be cut each year on each limit.

In 1883 the amount realized from sales was \$38,462 for 3,117 square miles. Ten years later under the new long-lease system the lands were sold at public auction for twenty-five years, the amount received for premiums and leases in 1893 being \$89,830. There were then issued 1,387 leases at an average price of \$17.25 a mile, and since then the number has steadily increased until practically all the available Crown lands of the Province have been brought under lease. In 1899 1,170 square miles were leased at an average of \$21 a square mile. The policy of long leases has resulted in material benefit to the lumbermen and contributed not a little to the prosperity of the trade. The receipts of the Provincial government for 1903 from sales and renewals of timber licenses were \$46,898 and from stumpage dues \$122,630, making a total of \$169,528.

The first act for the preservation of forests from fire was passed in 1885. By its provisions fires must not be started between May 1 and December 1 except for clearing land, for cooking and for other necessary purposes. The penalty for failing to take the necessary precautions in the selection of the places for these fires and in their extinguishment after they have served their purposes includes a fine varying for \$20 to \$200. Railway locomotives must be equipped with spark arrestors and section men must be given instructions to watch for and extinguish fires caused by railway trains. In 1897 further legislation to protect the forests from fires was secured when statutory authority was obtained for the appointment of forest rangers. The year 1903 was a notable one for unusually severe forest fires. It was estimated that during that year two hundred million feet of timber was destroyed by fire. The conflagration wiped out an entire village besides destroying many other buildings.

Some important changes in the mileage and stumpage rates and conditions under which licenses are issued took effect in 1904, all being in the direction of greater stringency. Under the regulations now in force the upset mileage on limits is \$20 a square mile, and the mileage payable yearly on renewals is \$8 a square mile. Licenses are to be for not more than ten nor less than two square miles and the licensee may

be required to cut ten thousand superficial feet a square mile. The holder of timber limits is not permitted to manufacture a log measuring less than eighteen feet in length and ten inches in diameter at the small end. The stumpage dues are as follows:

Spruce, pine, fir or hackmatack saw top, per 1,000 feet.....	\$1.25
Hardwood timber up to average of 14 inches square, per ton.....	1.10
Above 14 inches additional per inch, per ton.....	.10
Hardwood logs, per 1,000 superficial feet.....	.80
Pine timber up to 14 inches square, per ton.....	1.25
Additional per inch, per ton.....	.25
Hackmatack and spruce timber, per ton.....	.65
Cedar logs, per 1,000 superficial feet.....	1.25
Hemlock, per 1,000 superficial feet.....	.60
White birch logs, for spool wood, per 1,000 feet.....	.90

The following statement, taken from the surveyor general's reports, shows the quantities and kinds of timber cut from Crown lands during the fiscal years ended October 31, 1902 and 1903 respectively:

	1902.	1903.
Spruce and pine sawlogs, superficial feet....	88,531,693	90,857,515
Hemlock logs, superficial feet.....	2,388,567	2,627,694
Cedar logs, superficial feet.....	15,357,249	16,041,955
Hardwood logs, superficial feet	2,936,007	3,869,712
Hardwood timber, tons.....	54½	215
Fir logs, superficial feet.....	2,764,411	4,219,593

This statement, it should be borne in mind, covers only the cut upon public lands under license and takes no account of the very large quantity taken from forest lands belonging to private owners.

PRODUCTION OF TIMBER IN NEW BRUNSWICK.
(Compiled from the reports of the Crown lands department.)

Year.	Spruce and pine logs (superficial feet).	Hemlock logs (superficial feet).	Cedar logs (superficial feet).
1879.....	88,856,803	92,750	38,323
1880.....	117,534,482	106,271	79,824
1881.....	135,159,742	425,080	.....
1882.....	149,348,548	598,315	172,255
1883.....	144,843,725	14,579,860	804,525
1884.....	87,284,775	21,237,385	1,143,882
1885.....	60,417,896	372,532	1,144,695
1886.....	76,587,027	4,881,750	1,520,781
1887.....	64,800,098	3,567,445	1,525,076
1888.....	68,382,300	13,054,434	2,964,564
1889.....	79,287,013	17,584,208	4,063,549
1890.....	95,539,612	12,139,048	4,716,201
1891.....	66,355,301	12,777,830	5,029,723
1892.....	79,495,134	1,526,554	12,034,758
1893.....	86,809,334	7,015,471	13,950,428
1894.....	56,804,581	60,106	5,635,475
1895.....	81,289,061	15,815,314	9,677,642
1896.....	76,985,459	12,785,743	14,279,880
1897.....	102,841,781	2,246,104	11,239,208
1898.....	80,856,347	3,726,756	7,669,293
1899.....	80,739,731	851,100	11,318,188
1900.....	91,979,461	5,826,785	14,417,895
1901.....	83,449,123	1,907,816	11,187,791
1902.....	86,531,693	2,388,576	15,357,249
1903.....	96,857,515	2,627,694	16,041,955
Total.....	2,238,946,542	159,204,925	166,013,180

CHAPTER XX.

NEW BRUNSWICK—RECENT OPERATIONS.

Notwithstanding the extent to which lumbering has been carried on, the supply of spruce will last for an indefinite period under the conservative methods of cutting, as the spruce is a tree of rapid growth and will attain merchantable proportions in thirty years. On the public lands no tree is permitted to be cut that will not make a log of ten inches diameter at the top, eighteen feet up, although many private owners allow the cutting of small spruce for pulpwood.

Many of the large limit holders follow a system of rotation. The land is laid off in strips of one and one-quarter or one and one-half miles wide and from five to ten miles in length. One strip is cut over each year and all the merchantable trees taken. The next year the adjoining strip is worked, and so on until the larger of the young growth of the first strip is available. The tracts nearest the great rivers have been most thoroughly worked and each year the operations are more distant from the point of shipment.

The portable or small rotary mill is much used on small tracts of private land, and the annual product is considerable in the aggregate, but does not figure in the provincial returns. While the large mills are most numerous near the river mouth, still there are many scattered through the interior with facilities for shipping their product by rail or floating it down the rivers to the coast.

While spruce is the great article of export there is a large cut of cedar for shingles for the United States and local markets. A good deal of hemlock is also sent to the United States as boards and there is a growing trade with Britain in birch for spool wood. The pulp industry is undergoing a great development and new sources of supply, tapped by railways in districts from which the large timber has been taken, provide raw material for the pulp mills.

THE ST. JOHN DISTRICT.

St. John is the center of the lumber manufacturing and shipping trade. As the River St. John is over four hundred and fifty miles in length and has numerous tributaries, it drains an immense territory not only in New Brunswick but in the adjoining State of Maine and in the

Province of Quebec, so that a large portion of the logs manufactured in the St. John mills come from outside the Province. The manufacturers as a rule do not operate in the woods, but contract at so much a thousand feet for the cutting, rafting and driving of the logs to their mills. There are three log driving companies—the Madawaska, St. John River and Fredricton boom companies and also a company on the Tobique, the chief tributary of the St. John in New Brunswick. Driving is always an uncertain feature, as the Grand Falls, 225 miles from the mouth of the St. John, have a descent of seventy-four feet, below which is a narrow and deep gorge through which logs must pass. Logs are often hung up for the season or damaged by a jam in the gorge.

The leading shippers from St. John are W. M. Mackay, who exports about one hundred million feet annually, George McKean and the A. Gibson Railway & Manufacturing Company. W. Alexander Gibson, of the latter company, has been engaged in the lumber trade for about a half century. He commenced life as a poor boy and advanced step by step until he became manager of the finest mill in the Province. About 1864 he acquired the lumbering establishment of Rankine, Ferguson & Co. on the Nashwaak River about two miles from Fredricton and undertook a series of improvements, establishing a number of other industries such as cotton mills, tanneries, etc. The village erected by these activities is called Marysville. He subsequently extended his lumbering operations to the Miramichi district and built the Northwestern railway, opening up large tracts of timber lands in that region.

In 1871 the firm of Randolph & Baker erected a large mill two miles from the mouth of the St. John, which mill is one of the best sawing dimension lumber for the British market. The firm's plant has an annual capacity of twenty million feet of long lumber, and it also ships quantities of lath to the United States.

Frederick Moore, of Woodstock, New Brunswick, was born in Canterbury, York County, New Brunswick, in 1839. Between the years 1862 and 1884 he was one of the heaviest operators in Aroostook County, Maine, cutting from 5,000,000 to 15,000,000 feet of spruce annually for the St. John, New Brunswick, market. In 1884 he built a sawmill, with a planing mill, on the Maduxnaqueag River, a branch of the St. John River, for cutting logs from the Aroostook region. He occupies a prominent position in the New Brunswick trade.

In 1904 a total of 183 vessels cleared from St. John with lumber, a slight increase over the 171 lumber clearances in 1903. In 1904 cargoes embraced 463,585 tons, or 172,995,507 superficial feet, while the cargoes of 1903 included 411,546 tons, or 174,360,562 superficial feet. The shipments were to Liverpool, London, Glasgow, Belfast, Dublin and ports in Spain, Australia and other countries. In 1904 the shipments of birch were 3,567 tons, compared with 4,498 tons in 1903. Pine timber shipments were fifteen tons, a marked decrease from the forty-eight tons shipped in 1903. Shipments from the thirteen other ports in New Brunswick in 1904 brought the total amount of deals and other lumber shipped from the Province up to 641,711 tons, or 358,851,893 superficial feet.

St. John's export trade in forest products is larger than that of any other port in Canada, except Montreal, amounting in value during the fiscal year 1903 to \$4,298,308, including the following items: Pine deals, \$10,801; spruce and other deals, \$2,496,467; planks and boards, \$624,943; shingles, \$339,699.

THE MIRAMICHI DISTRICT.

The Miramichi district has witnessed changes similar to those which have characterized the development of the industry in the region tributary to the St. John. It had formerly its pine timber and lumber period and extensive shipbuilding operations. The trade of the present day is mainly in spruce deals, with some business in spool wood and a growing demand for pulpwood. There are two branches of the Miramichi, which unite about twenty miles from the bay into which it flows and have a tributary area of many thousand square miles. The streams extend far westward toward Maine. The great bulk of the cut is spruce, only about five percent being pine, with some hardwood, cedar and hemlock. Practically all timber lands tributary to the Miramichi and Crown lands are owned by the New Brunswick Railway Company. Under the regulations in force for cutting there is a chance for the spruce to reproduce itself and, while the average size of logs shows a decrease, there is no absolute clearing of the forest. The more desirable tracts are becoming less accessible yearly. The railway company looks carefully after its timber interests and has a staff of scalers and foresters, charging a rate of \$1.50 per 1,000 feet to operators.

The log cut on the Miramichi for the season of 1902-3 was 125,000,000 feet, as compared with 123,000,000 feet for the previous season. Miramichi ranks next to St. John among the lumber shipping ports of

the Province, the trans-Atlantic shipments for 1903 being 102,944,276 feet and for 1902, 123,000,000 feet.

The spool wood industry has attained its greatest development on the Miramichi, where 3,000,000 or 4,000,000 feet of birch are taken out annually for this purpose. Clark, Skillings & Co., of Glasgow, have three mills cutting about 2,500,000 feet each year.

THE RESTIGOUCHE DISTRICT.

In the Restigouche district there is still much virgin forest, spruce and cedar predominating. Some pine and a good deal of birch, maple and beech are also found. Nowhere else in the Province is cedar so plentiful and the export trade in shingles is large. The Restigouche River, two hundred miles in length, forms a part of the boundary between New Brunswick and Quebec, receiving tributaries from both Provinces, so that much of the cut of the Restigouche comes from Quebec lands. The shipping ports for this district are Dalhousie and Campbellton, the trans-Atlantic exports of lumber for 1903 from these points being respectively 20,910,384 and 18,075,362 feet. These figures, however, are considerably swollen by the amount of lumber manufactured in the Province of Quebec and forwarded by rail for shipment abroad.

The total trans-Atlantic shipments of lumber from New Brunswick ports amounted to 452,000,000 feet in 1902 and 391,000,000 in 1903.

Hon. Jabez B. Snowball, lieutenant governor of New Brunswick, has been prominently identified with the Miramichi lumber industry for over thirty-five years. He was born in England, reared in Newfoundland and made his success in New Brunswick. He did the latter Province valuable service in promoting and building a railway. His first mills were on the Miramichi River, and at Chatham he built a mill with a daily capacity of 170,000 feet, the largest on the river. In 1900 the interests of Mr. Snowball were converted into a joint stock company, which is known as the J. B. Snowball Company, Limited, and is composed of members of his family. The company cuts between 30,000,000 and 40,000,000 feet of lumber each year and owns nearly six hundred miles of timber limits on Crown lands, held on the twenty-five year system. It owns six tug boats on the Miramichi River, employs nine hundred men in the busy season and has extensive commercial interests. Mr. Snowball was the chief factor in the organization of the first electric street and domestic lighting service and also the first public telephone service in New Brunswick. His interest in forestry matters has been marked, and he has been of much service in furthering a better organization of the lumber industry.

Hon. John Percival Burchill, of South Nelson, New Brunswick, is a member of a family which for the last sixty years has been engaged in the lumber business in New Brunswick. He was born in 1855 on the Miramichi River, and in the year 1875 took charge of the outside operations of his father's business. In 1881 he entered into partnership with his father and brothers under the firm name of George Burchill & Sons. They own over 150 square miles of timber limits in the Province. Mr. Burchill has taken a conspicuous part in public life. He was elected as a Liberal to the New Brunswick Legislature in 1882, and has served two terms as Speaker of that body.

James Murchie, of Milltown, New Brunswick, was born at St. Stephen, that Province, August 13, 1813, of Scotch parentage. He began life as a farmer and cut timber in a small way to sell to mill owners as an additional source of income. Gradually his transactions increased until in 1859 he engaged in the manufacture of lumber, taking his sons into partnership. James Murchie & Sons, in addition to their establishments at Benton, Deer Lake, Fredricton and Edmundston, New Brunswick, operated extensively in the adjoining State of Maine. They acquired large areas of timber lands and a strong financial position, although they suffered severe losses from fire. Mr. Murchie filled many leading positions, including the presidency of the New Brunswick & Canadian Railroad Company and the Frontier Steamboat Company. He died, at the age of eighty-six, May 29, 1900.

The late William Richards, who was one of the most extensive lumber operators on the Miramichi River, New Brunswick, was born in Cardigan, York County, that Province. He died at his home in Boies-town, New Brunswick, June 1, 1903, after more than a year's illness, aged sixty-eight years.

CHANGES OF A QUARTER CENTURY.

Great changes have taken place in the conditions pertaining to the New Brunswick industry and trade within twenty-five years. One of the more notable of these changes is the effect of repeated timber cuttings on the size of the logs. The sawyer of the late '70's would have been astonished had he been asked to saw out a specification from such logs as are now being used. Half a dozen log surveys (spruce) chosen from a file at random and dated April and May, 1881, show nine pieces to the thousand feet; a like number, dated April, 1904, shows that seventeen pieces were required to make up the same quantity.

Each winter, as it came, found the logging crews penetrating farther

and farther into the forests that bordered the main streams and estuaries of the St. John River, the Miramichi and the Restigouche. Most of the ground has been cut over several times, and in nearly all cases long before the new growth has attained a size at all comparable with the original growth.

What the ultimate result of this decline in quality will be is hard to decide. On the St. John River, where the industry is the oldest, the results are beginning to be apparent in a slow but sure curtailment of the annual output. In other sections of the Province the limits have not been worked for a long period and the timber is therefore better. One vital effect that is certain to follow the scarcity of large timber will be the lack of new blood and new capital in the industry. The virgin forests of newly settled countries are sure to attract those who have the desire and means to devote themselves to the manufacture of lumber. The demands of the pulp manufacturers for material in the shape of undersized logs have had, during the last few years, and will have in time to come, a tendency to still further reduce the average size of available timber throughout the lower counties of New Brunswick, and all other sections in the vicinity of pulp mills. Heretofore, trees that were not large enough to be manufactured into lumber were allowed to stand until they had attained the necessary dimensions; nowadays, in numerous instances, they are cut for pulpwood, the anxiety to realize upon them quickly being, of course, the chief inducement.

Another marked change in New Brunswick lumber conditions has resulted from the diminution of the annual output of pine. Until about 1888 pine was the staple forest product, American mills manufacturing little else. Year by year the quantity of pine logs cut has decreased, until in 1904 1,000,000 feet would easily cover the total manufacture on the St. John River. The logs secured in late years are small and of an inferior grade, compared with those of the last century. In the early '80's, when provincial logs were worth from \$9 to \$12 a thousand feet on the St. John, considerable variation was the rule, owing to the corresponding variation in the size and quality of the logs. They would probably be a great deal higher today were they obtainable. It is scarcely worth while to make any comparison with the present prices, as they are seldom on the market in lots of importance.

As pine gradually became scarcer, spruce came more into demand and also more valuable year by year, in spite of the gradual degeneration in size. This increase in value is due chiefly to three facts: The

logs are harder to get; wages and supplies are more costly, and stumpage rates of the material have increased. From 1880 to 1885 spruce logs that could not be duplicated in the provinces today at any price brought from \$7 to \$8.50 a thousand feet at the mill; from these figures the price crept slowly upward until it reached \$12.50, which price was touched in 1904. During the twenty-five years immediately preceding 1905, the market price of spruce lumber in the United Kingdom had been creeping up slowly but surely. In the year 1879 prices were extremely low, several large lots having been disposed of at figures that left from \$5.75 to \$6 a thousand for merchantable lumber. Of course, it would not be reasonable to use these figures as a criterion, for the year mentioned was one of light demand, forced shipments and the consequent lower prices mentioned above. For several years following, the trade showed a marked improvement both in prices and demand. A fair average price for the early '80's would have been \$8.50 a thousand for merchantable spruce deals. From that time until the year 1900 prices rose gradually, interrupted, of course, by many periods of temporary depression, due to the presence of unfavorable conditions; but always, when the reaction set in, gaining more than had been lost. The end of the century found the figures in the vicinity of \$11.50 for merchantable. Then followed three prosperous years. The demand during that period was extremely brisk and the shipments from the provinces were larger than they had ever been before, conditions being so favorable that in many cases the American logs (which are worth \$2 more a thousand, because their product, when they are manufactured by an American citizen, is allowed to go into the United States free of duty) were sawed into English size and shipped to the United Kingdom.

The high water mark in prices was touched in 1903 when merchantable deals were sold in large quantities at figures that ranged from \$13.25 a thousand to \$13.75 f. o. b. steamer at New Brunswick ports. Early in 1904 the English market took a decided slump. Prices fell suddenly and emphatically until on September 1 purchases could have been made as low as \$11.50 a thousand, with lumber plentiful.

The general decrease in the size of logs being sawed has had a marked effect upon the quantity of wide deals turned out, and the result is that the difference in the percentage of the wide lumber in the specifications is apparent and quite important in figuring the value of lumber.

In recent years it has been the general impression that the average quality of lumber produced is much lower than that manufactured twenty-five years previous. This is owing to the fact that the larger growth was certain to be cleaner and to have fewer knots and twists. Of course, in making a comparison of prices prevalent in recent years with those of former times, this depreciation in size and quality is an important element.

Twenty-five years prior to 1905 consignments to the markets of the United States from New Brunswick consisted chiefly of pine, the greater part of which was made up of one-inch boards. In later years, for reasons mentioned in an earlier paragraph, shipments of pine are few and light. With spruce it is exactly the reverse. In the late '70's and early '80's the shipments of spruce from the Maritime Provinces to the United States were not of great importance; recently spruce is the staple.

The spruce trade with the United States has also changed in this, that the smaller sizes have been much less in demand during the last few years, whereas formerly the demand was principally for plank and scantling. Recently it has run chiefly to three-inch stock.

On the whole the variation in price has not been so great as in the case of the English markets, although sudden fluctuations are more frequent. It is estimated that the output of spruce lumber in New Brunswick in 1904 was 80,000,000 superficial feet. The estimated output for 1905 was 95,000,000 feet. The output in cedar shingles in 1904 was about 260,000,000 pieces, as compared with 255,000,000 in 1903. The market prices of spruce lumber at Campbellton in 1904 were: \$18 a thousand for 10-inch and 12-inch dimension, \$14 for 9-inch and under, \$16 for 10-inch and 12-inch random lengths 10 feet and upward in length, and \$12 a thousand for 2x3, 2x4, 2x5, 2x6, 2x7, 3x4, 10 feet and upward in length; \$11 for all other randoms 9 inches and under in size 10 feet and up in length; \$11 for 5-inch and upward widths merchantable boards; \$18 to \$26 for matched boards; \$9 for spruce boards; \$11 for bundled furring; \$8 for pickets, and \$2 for lath. Spruce clapboards, extra, \$42; clear spruce clapboards, \$40; second clear, \$38; extra No. 1, \$32; No. 1, \$21; No. 2, \$12.

The market prices of cedar shingles at Campbellton were: Extras, \$2.60; clear, \$2.10; second clear, \$1.60, and extra No. 1, \$1.10.

LUMBER STATISTICS.

According to the Canadian census of 1901, the number of sawmills

in the Province of New Brunswick was 236 and the value of the product \$7,041,848. As the census, however, includes only industries employing five or more hands, some of the smaller mills are not enumerated. The value of forest products in the rough is given as follows: Square, waney or flat timber, \$34,484; logs for lumber, \$1,667,694; pulpwood, \$37,577; miscellaneous, \$1,295,860; total, \$3,035,615. The following are the quantities and values of the items under the two former heads:

SQUARE, WANey OR FLAT TIMBER.

	Cubic feet.	Value.
Ash.....	1,998	\$209
Birch.....	153,314	17,010
Elm.....	1,160	116
Maple.....	4,722	476
Oak.....	200	28
Pine.....	60,009	6,722
All other timber.....	99,472	9,923

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm.....	491,000	\$1,560
Hickory.....	35,000	184
Hemlock.....	26,696,000	107,571
Oak.....	25,000	232
Pine.....	19,166,000	125,213
Spruce.....	182,759,000	1,099,302
All other logs.....	61,721,000	333,632
Wood for pulp (cords).....	14,486	37,577

The forests of New Brunswick always have been her greatest source of wealth, and lumbering has been her greatest industry. Her first important exports were lumber products and to this day the forests furnish employment for a large proportion of her people and a splendid revenue to her internal government. The volume of the product shows a wonderful persistence, and it seems likely that, with the practice of conservative forestry methods and the large area illy adapted to agriculture, the forests will forever remain the chief resource of the Province.

Complete figures of logical arrangement are difficult to procure, but the following tables give the most important facts as to the trade history of the Province, and many enlightening details.

LUMBER AND TIMBER SHIPMENTS OF NEW BRUNSWICK.

Shipments from Miramichi for thirteen years, from 1892 to 1904 inclusive, in feet, were:

1892.....	95,000,000	1899.....	129,000,000
1893.....	83,000,000	1900.....	123,000,000
1894.....	96,000,000	1901.....	129,000,000
1895.....	82,000,000	1902.....	123,000,000
1896.....	106,000,000	1903.....	102,944,276
1897.....	102,000,000	1904.....	94,500,000
1898.....	113,000,000		

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The shipments during 1902 from various New Brunswick ports were as follows :

Port.	Shippers.	Cargoes.	Tons.	Board measure.
Miramichi.....	11	99	114,200	122,017,741
Dalhousie.....	8	37	28,224	26,344,112
Campbellton.....	3	30	22,824	24,142,117
Bathurst.....	2	16	18,708	20,874,278
Sackville.....	4	21	36,687	16,526,150
Hopewell.....	2	5	9,198	13,754,451
Harvey.....	4	7	9,786	9,816,040
Shediac.....	4	13	6,846	6,855,637
Richibucto.....	2	14	6,239	6,571,351
Buctouche.....	1	2	932	897,172
Hillsborough.....	2	3	1,561	1,898,038
St. John.....	..	..	..	200,662,534

*In addition to the above, Miramichi exported 29 tons of birch and 1,159,065 feet of box shooks in 1902.

SHIPMENTS FROM NEW BRUNSWICK BY PORTS, 1903 AND 1904.

Port.	1903. Superficial feet.	1904. Superficial feet.
St. John.....	174,360,562	172,995,507
Dalhousie.....	20,910,384	22,097,965
Campbellton.....	18,075,362	23,077,883
Bathurst.....	20,770,642	16,273,355
Chatham.....	71,670,117	57,294,488
Newcastle.....	34,123,256	37,255,841
Richibucto.....	4,735,614	2,784,477
Buctouche.....	897,418	754,580
Sackville.....	8,545,560	6,205,370
Shediac.....	2,391,141	2,801,271
Hopewell Cape.....	26,834,162	5,138,666
Hillsborough.....	1,912,237	4,515,371
Harvey.....	3,135,250	6,331,152
Dorchester.....	.....	1,355,767
Total.....	388,361,705	358,881,893

Decrease in 1904, 29,479,812 feet.

DISTRIBUTION OF ST. JOHN, NEW BRUNSWICK, SHIPMENTS FOR THE YEARS 1903 AND 1904.

Port.	1903. Superficial feet.	1904. Superficial feet.
Liverpool.....	37,515,600	32,629,698
Bristol Channel.....	30,337,578	32,869,095
Barrow.....	5,234,905	4,770,241
London.....	6,208,164	12,541,993
Manchester.....	24,820,185	30,523,660
River Mersey.....	1,748,944	.....
Glasgow.....	19,295,791	17,443,413
Greenock.....	863,056	1,105,481
Limerick.....	4,578,164	594,058
Belfast.....	14,181,266	6,008,899
Silgo.....	394,177	484,991
Dublin.....	3,930,494	.....
Bantry.....	805,644	751,983
Londonderry.....	2,785,292	1,537,018
Drogheda.....	.....	736,798
Australia.....	1,638,263	10,678,148
Spain.....	1,657,775	596,672
Other ports.....	16,365,364	19,725,399
Total.....	174,360,562	172,997,547

Decrease in 1904, 1,363,015 feet.

LUMBER INDUSTRY OF AMERICA.

SHIPPERS FROM PORT OF ST. JOHN.

Shippers.	1903.	1904.
W. M. Mackay.....	96,972,187	61,638,915
A. Gibson Ry. & Mfg. Co.....	25,619,521	33,858,471
Geo. McKean.....	29,665,471	42,335,455
Other shippers.....	20,103,433	35,162,907
Total.....	174,360,582	172,995,848

SHIPPERS FROM PORTS OF MIRAMICHI IN 1904.

Shippers.	Superficial feet.
F. E. Neale.....	39,000,000
Snowball Co.....	20,000,000
W. M. Mackay.....	11,000,000
D. J. Richie Co.....	11,000,000
E. Hutchison.....	8,000,000
G. Burchill & Sons.....	4,000,000
Damery & McDonald.....	1,500,000
Total.....	94,500,000

SHIPMENTS FROM ST. JOHN, NEW BRUNSWICK, TO TRANS-ATLANTIC PORTS
FROM NOVEMBER 30, 1901, TO NOVEMBER 30, 1902.

To	Lumber, board measure.	Tons timber.		To	Lumber, board measure.	Tons timber.	
		Pine.	Birch.			Pine.	Birch.
Liverpool.....	48,642,866	54	2,076	<i>Brought forward.</i>	169,083,902	54	2,201
Birkenhead.....	2,005,242			Limerick.....	3,518,190		
Manchester.....	34,754,366			Londonderry.....	1,868,856		
Barrow.....	5,118,365			Belfast.....	3,628,546		
Preston.....	3,428,060			Dublin.....	11,595,324		
Cardiff.....	20,139,606			Cork.....	1,872,574		
Sharpness.....	14,324,589			Youghall.....	506,043		
Bristol.....	3,471,095			Drogheda.....	454,060		
Barry.....	1,850,879			Bantry.....	801,085		
Avonmouth.....	2,637,118			Malaga.....	856,501		
Newport.....	3,638,104			Lisbon.....	598,378		
Swansea.....	3,466,251			Bilboa.....	554,684		
Glasgow.....	15,896,385			Valencia.....	842,368		
Ayr.....	669,332			Cora Blanca.....	96,572		
London.....	10,293,428		125	Santa Cruz.....	1,197,308		
Sutton Bridge Dock..	755,216			Melbourne (Australia)	3,192,195		
<i>Carried forward.</i>	169,083,902	54	2,201	Total.....	200,662,534	54	2,201

LUMBER SHIPMENTS FROM ST. JOHN TO TRANS-ATLANTIC PORTS FOR
THIRTEEN YEARS.

Year.	Total feet board measure.	Timber (tons).	
		Birch.	Pine.
1892.....	146,529,309	10,200	....
1893.....	156,663,334	5,294	....
1894.....	153,478,076	5,015	....
1895.....	126,449,706	8,374	324
1896.....	167,249,707	9,892	128
1897.....	244,399,066	9,454	92
1898.....	184,954,343	6,636	95
1899.....	184,192,435	5,859	131
1900.....	236,459,838	5,851	71
1901.....	176,295,257	6,306	50
1902.....	200,662,534	2,201	54
1903.....	174,360,562	4,498	48
1904.....	172,995,507	3,567	15

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TOTAL TRANS-ATLANTIC SHIPMENTS OF NEW BRUNSWICK, 1901 COMPARED WITH 1902.

From	1901.		1902.	
	Lumber, board measure.	Tons timber.	Lumber, board measure.	Tons timber.
St. John.....	176,295,257	6,256	200,662,534	2,255
Miramichi.....	128,827,450	61	123,176,806	29
Moncton { Hillsborough.....	25,478,403		1,898,088	
{ Hopewell.....			13,754,451	
{ Harvey.....			9,816,040	
Shediac.....	4,774,000		6,855,637	
Dalhousie.....	18,966,980		26,344,112	
Campbellton.....	19,661,270		24,142,117	
Richibucto and Buctouche.....	3,943,143		7,468,528	
Sackville.....	4,566,278		16,526,150	
Bathurst.....	16,361,944		20,874,278	
Total.....	398,874,725	6,317	451,518,691	2,284

The trans-Atlantic shipments from the Province of New Brunswick for thirteen years were:

	Feet board measure.		Feet board measure.
1892.....	325,000,000	1899.....	426,000,000
1893.....	312,000,000	1900.....	499,000,000
1894.....	326,000,000	1901.....	399,000,000
1895.....	291,000,000	1902.....	452,000,000
1896.....	386,000,000	1903.....	398,361,705
1897.....	494,000,000	1904.....	358,881,893
1898.....	412,000,000		

The United States Consulate at St. John has compiled the following statement of values of shipments to the United States for 1903 and 1904:

CANADIAN PRODUCT.

	1903.	1904.
Lumber.....	\$197,821	\$104,908
Lath.....	187,295	211,296
Shingles.....	53,021	31,552
Total.....	\$438,137	\$347,651

AMERICAN PRODUCT.

	1903.	1904.
Lumber.....	\$435,664	\$448,071
Lath.....	57,668	52,400
Shingles.....	100,882	36,602
Total.....	\$593,714	\$537,073

In addition, there were shipped to countries other than the United States approximately 358,000,000 feet of lumber from the Province of New Brunswick in 1904, an approximate decrease of 30,000,000 feet from shipments of 1903. There was a decrease of 5,000,000 feet in Liverpool consignments, but an increase of 6,000,000 feet in lumber consigned to Manchester.

CHAPTER XXI.

NOVA SCOTIA—LUMBER HISTORY.

Nova Scotia was the first settled of any of the Canadian provinces, a colony being established at Annapolis, then Port Royal, as early as 1605. At that time and for long afterward it was noted for the density of its forests; and, in fact, it was over two hundred years before roads were cut through it for any distance into the interior, the settlements being confined to the coast and the land accessible by the rivers. One hundred years ago the country was heavily timbered with spruce, pine, hemlock, fir, poplar, hackmatack and various hardwoods—white birch, yellow birch, red birch, maple, beech and oak.

The lumbering industry was actively pursued in Nova Scotia at a time when the sister Province of New Brunswick, then included within her limits, was an unpeopled wilderness. A return of the several townships of Nova Scotia January 1, 1781, reported among the industries then extant thirty-one sawmills with an aggregate output of 1,271,000 feet of lumber. The first exports were to the United States on a very limited scale, and at a later date a large trade in lumber was built up with the West Indies, under the stimulus of which the industry rapidly developed. The demand for shipbuilding purposes was another factor in encouraging the production of timber.

Joseph Bouchette in his descriptive work, "The British Dominions in North America," published in 1832, writes as follows regarding conditions in the trade during the early part of the century:

"There are sawmills in every district of the Province, and even as far back as 1785 there were ninety of them in the country. The number has been vastly increased since that period. The quantity of lumber prepared and exported is momentous, and it is considered as good here as in any other part of America. Shipbuilding is carried on to a great extent in every part of the Province. In the ship yards of the peninsula alone there were built in the year 1826 131 vessels containing 15,535 tons, and in 1828, ninety-four vessels containing 6,560 tons. The average quantity of shipbuilding is not less than 10,000 tons per annum, principally sloops, schooners and vessels for the fishery."

Dr. Abraham Gesner, writing of the "Industrial Resources of Nova

Scotia," in 1849, deploras the tendency of the timber trade to divert the attention of the settlers from agriculture, asserting that, owing to the inducements it held out, thousands of farms had been abandoned or neglected. "In drawing away great numbers of the active part of the population to the backwoods," he writes, "agriculture has languished and the general prosperity of the country has been retarded."

During those palmy days of the trade every river and log driving stream was followed to its source and the timber cut away after the reckless and improvident fashion of that time. Until, indeed, a comparatively recent period the operators in the Province have in the main followed the policy of making a thorough clearance of all merchantable timber in sight. In this respect they did not differ much from operators elsewhere and, under the conditions then prevailing, had every inducement to realize the resources of their holdings as rapidly as possible, owing to the frequency and extent of forest fires, which usually follow lumbering operations and the progress of settlement, destroying what the ax spares. Later there was a law covering forest protection, but until recently there had been no enforcement of the act.

The destruction of the forests was accelerated by the system of land grants and the readiness of the Provincial government to part, for a very trifling consideration, with the fee simple of large areas of the public domain, the policy in the early history of the country being to get it settled at any cost. Grants were made of large areas to private individuals, and a large number was issued to soldiers to take up wild land. These extensive holdings, secured by the early settlers, usually ran back from the river front near which the farms were located, including a large area of timbered land on the higher ground to the rear, the lots frequently having a depth of several miles. As the timber remaining increased in value it was utilized by small portable sawmills moving from one place to another wherever a cut of a few thousand feet could be secured.

Outside of these individual holdings was a large tract of timber in the interior divided by a watershed running east and west. Here, as in other localities, extensive grants have been made from time to time to large operators, railway companies, etc., until nearly the whole of the timber land has passed out of the hands of the Government.

Nova Scotia offers an excellent field for forestry operations, as the producing farm lands lie in the valleys, while the foothills and the interior are nonagricultural in character and will always be more

valuable for the production of timber than for any other purpose. Forests naturally reproduce themselves more rapidly in Nova Scotia than in almost any other section of the country, due to natural conditions favorable to tree growth.

Owing to the length of time the country has been settled and to the destructive and improvident methods of lumbering pursued, the timber resources, once so great, have been largely exhausted. Cape Breton Island, which forms a portion of the Province, has practically no spruce timber that would make deal stock, though it has considerable hardwood. In the remainder of the Province the area of good timber land is estimated at about 2,700,000 acres. In an official statement of some years ago, the average stumpage of the timber lands was estimated at about 2,000 superficial feet an acre of merchantable spruce, 1,500 feet of hemlock and 500 feet of hardwood. This would make about 5,400,000,000 feet of spruce, 4,050,000,000 feet of hemlock and 1,350,000,000 feet of hardwood; but as cutting has been going on steadily in the meantime, it is safe to make a considerable deduction from these figures. This computation was made as an average over the whole territory, as some lands yield only spruce, some hemlock and others hardwood, while in some sections all are to some extent intermingled.

When cutting first began it was almost entirely confined to the white pine, which has now practically disappeared with the exception of some tracts in western Nova Scotia and a scattered young growth which, if preserved, may become valuable some day. Spruce is the mainstay of the Province. The old growth of spruce is confined to the holdings of large operators and scattered tracts in the remoter sections. The average timber is straight and of good size and height, usually producing three or more logs to each tree. The new growth of the Province is largely spruce and will grow to cutting size in thirty to forty years. The pulp mills are taking much of the small spruce, and in addition there is a large export to South America of spruce one inch by two inches up, and two inches by three inches up, for which the small trees are cut. Conservative operators cut down trees twelve to thirteen inches at the butt, or larger, leaving the others standing. With proper care in sawing the very young trees and bushes, they are able to go over these lands every seven to ten years for a new crop, making the yield practically perpetual. Although there is a supply of extra good spruce for pulpwood, this industry had not been developed until recently; now, however, pulp operators are seeking timber areas in the

Province, owing to reasonable prices for lands, large bodies of timber to be secured and favorable water conditions for power to operate and develop mills.

Until a recent period, hemlock had not been largely manufactured and little use had been made of the bark. There are now large tracts of hemlock that command attention and, with the advancing prices of bark, they will be a valuable asset to the lumberman. Fir has been largely killed by insects, but is used to some extent for cooperage. There is practically no cedar. The hardwood as a rule grows mixed and, except in a few localities, pays only to cut as it runs. Birch of the white and yellow varieties, maple and beech are abundant. Oak is scattered, the principal growth being in Queens, Lunenburg and Shelburne counties. There is a scattered growth of poplar of small size, which is cut for pulp and staves. There is practically no elm, and but little ash. Until the present time hardwoods have not been cut for export, except for the English market in moderate quantity. But there has been and still is a large annual cut used for firewood, both locally and for export to the United States, and hardwood is also extensively used for shipbuilding. In the eastern end of the Province there are extensive tracts of birch in Guysborough County, and in the western country hardwood is distributed all through the green wood, much of it being old growth of good proportion. The extension of the railways will make these hardwoods more accessible and will probably lead to a large cutting within a short time.

As the policy of Nova Scotia until recently has been to sell the public lands in fee simple, making no distinction between timber producing and agricultural lands, there are no government dues payable on the cut of timber and no returns made to the Provincial government regarding the annual output. An important change was made in the law in 1899 by which it was provided that, instead of granting the lands as theretofore, the Government may issue leases, for the purpose of cutting and removing timber only for the period of twenty years at not less than forty cents an acre for the term, subject to renewal. It was furthermore provided that in case of more than one application for the same tract the lease may be put up to competition and go to the highest bidder. The lessee is entitled to take all timber of not less than ten inches diameter. Leases may be made at fifty cents an acre for the same term permitting the cutting of timber not less than five inches in diameter, and the Government is empowered to lease on other

terms where the land is of inferior quality and the lessee is prepared to expend money in the erection of pulp mills, etc. The Government is also authorized to repurchase at not more than twenty-five cents an acre land previously granted for lumbering purposes.

This legislation unfortunately comes too late to have much effect in preserving the government timber resources of the Province, as the area of valuable timber lands remaining under the control of the Government is inconsiderable. In 1903 only 1,464,726 acres of land of any description remained ungranted, of which only five percent was timbered, most of it being a poor description of wild land.

The receipts from Crown lands in Nova Scotia in 1904, left an actual surplus of \$13,235.65 after expenses of \$10,645.51 had been paid. This \$10,000 item includes, as usual, all the cost of surveys, although under a recent act this cost has to be borne by the applicant. The sum received from these new sources has been placed in the treasury of the department. During 1904 no very large leases were issued, there being none of over 10,000 acres, and nearly all of them were issued to persons actually engaged in the lumber business.

The timber of Nova Scotia is now owned by private individuals and corporations. It is estimated that about one-half the wooded lands is in the possession of large holders. The other half is owned by settlers and consists of small holdings of under a thousand acres. The larger holdings are being added to, and their position has been much strengthened during the last two or three years. The owners also control valuable water privileges and shipping facilities. The lands are situated on rivers where there is an opportunity to drive logs to the mills, and, in many cases, to tide water, where they are manufactured and shipped. There is excellent water power all over the Province, sufficient for lumbering and pulp and paper mills. A logging railway is now under construction near Bridgewater to be operated by the Davison Lumber Company, Limited. Many of the rivers furnish water power for electric light, so that manufacturing is no longer confined to the hours of daylight.

As has been mentioned already, there was a law in Nova Scotia regarding the protection of forests from fire, but it was not enforced. The lumbermen's association of western Nova Scotia, with the help of the boards of trade, has succeeded in having this law amended so that it can be enforced, and, consequently, there has been decided improvement in this regard. It is now believed that it is possible to prevent

large forest fires in the future. If this is done there is no doubt but that the growth of wood in Nova Scotia is going to increase the available timber within a short time. The amended law provides for a chief fire ranger in each county who has the privilege of appointing under him other rangers to assist him in his duties. These rangers are periodically to go over their timber district and put out all fires that may occur, and the chief ranger makes a report of each year's work to the Government. This special work is paid by government salary to the head official, and the municipality pays for the work done. The holders of timber lands in each county owning 1,000 acres and over each are taxed one-fourth cent an acre. This is a special tax levied for the purpose of controlling forest fires, and is paid into the municipality. It is probable that in ordinary seasons this special tax will cover the cost of protection. Any balance left over goes to the credit of the funds; but, in case this tax is not sufficient, the municipality is to pay any deficit that may occur. The act regarding forest fires has been enforced in the municipalities of Annapolis, Digby, Clare, Yarmouth, Shelburne, Queens, Lunenburg, Colchester and Pictou, where chief rangers have been appointed.

SOME NOTEWORTHY LUMBERMEN.

Among lumbermen of Nova Scotia worthy of especial mention is E. D. Davison. He was the founder of the firm of E. D. Davison & Sons, Bridgewater, Nova Scotia, and died in the summer of 1902, in his fifty-seventh year. He was one of the most extensive operators in the Province of Nova Scotia, and is said to have built in 1845 the first steam sawmill erected in the Province. The firm held 200,000 acres of timber lands on branches of the Lahave, Medway and Nictau rivers, where its operations were principally carried on. Mr. Davison spent his lifetime in the trade and was regarded as one of the best authorities in Nova Scotia on all matters connected with lumber and forestry. He took a keen interest in public affairs and was mayor of Bridgewater and representative of Lunenburg County in the Nova Scotia Legislature. In 1903, the business, then known as E. D. Davison & Sons, Limited, was purchased by J. M. Hastings and associates, of Pittsburg, Pennsylvania.

Lewis Miller, a large owner of lumber mills in Scotland and Sweden, finding that his forests in the latter country were becoming exhausted, turned his attention toward British America in 1900. He purchased extensive forests near the center of Newfoundland and at Glenwood and

Red Indian Lake in that colony he built large mills. Upon the receipt of a tempting offer from an American syndicate in 1903, he sold out his Newfoundland interests. In October of the same year he transferred his operations to Nova Scotia, where he purchased the properties of the Dominion Lumber Company, comprising a mill at Ingram Docks, twenty-five miles from Halifax, and 80,000 acres of timber lands. He began operations in June, 1904, and manufactures extensively for the British market. Mr. Miller was born in 1848 at Crieff, Perthshire, Scotland.

The St. Croix Lumber Company, of Hartville, Nova Scotia, was incorporated in December, 1903. The concern began operations by purchasing the mills and limits of T. G. McMullen, of Hartville. The limits comprise 30,000 acres of first class timber lands, heavily covered with pine, spruce, hemlock and birch. David McPherson, the president of the company, was born in Shelburne County, Nova Scotia, in 1834, of Scotch parents. On attaining the age of manhood he went to Halifax and began work as a shipbuilder, soon building up a large trade in the construction of wooden ships, which he owns and runs to this day. At the age of thirty-five he became interested in public affairs, and was shortly afterward elected to the city council of Halifax. Since then he has twice been elected mayor—1892-8. In 1898 he entered the Provincial House and soon distinguished himself, being appointed a member of the Cabinet of Nova Scotia in 1900.

CHAPTER XXII.

NOVA SCOTIA—EXPORTS, STATISTICS.

Nova Scotia has excellent shipping facilities. No part of the country is over sixty miles from tide water, and numerous navigable rivers flow into the Atlantic, Gulf of St. Lawrence and the Bay of Fundy. Three railway systems, namely, the Intercolonial, the Dominion Atlantic and the Halifax & Southwestern, are in operation and the rails extend the whole length of the Province. The shipping points of the railways are Sydney, Pictou, Pugwash, Windsor, Kingsport, Annapolis, Weymouth, Yarmouth, Tusket, Bridgewater, Lunenburg and Halifax, from which lumber is exported; and, besides these places, there are many ports and harbors on the coast available for good sized vessels and from which lumber is shipped. The bays and harbors indenting the shore are very numerous, making the coast line about one thousand miles in extent. The harbors on the Atlantic Coast have a good depth of water and very little tide. The shipping ports on the Bay of Fundy have strong tides, the rise and fall being from twenty-five to forty feet. In many of these places vessels load lying aground, or in the stream, where they can lie afloat, from barges and lighters.

At Ship Harbour, Halifax County, there is thirty feet of water at the mills; at Liscomb, twenty-two feet; at Sheet Harbour, twenty-eight feet; at St. Mary's River, seventeen feet, and at Bridgewater and Lunenburg, seventeen feet. There is no better harbor in Canada than Halifax, from which the annual export of lumber is over 60,000,000 feet—more than that from all the other ports of the Province combined.

Particular stress is laid upon the shipping conditions of Nova Scotia for the reason that the Province depends entirely upon the export trade. The home consumption is so light that it need not be taken into consideration. Thus the small population or previously slow growth of the Province, slow compared with that of other countries, has not had the effect of conserving the timber. On the contrary, the continued activity of the export trade of the last fifty years has reached the stage where the annual cut of the Province has caught up with the yearly growth.

Nova Scotia has the following markets for its products: The United

States, England, Ireland, Scotland, France, West Indies, Cuba, Argentine Republic, Brazil, British Guiana and Trinidad. Water transportation from points in western Nova Scotia ranges from 300 to 500 miles to New York, Boston and Philadelphia.

There are two grand divisions to be made in considering the lumber exports of Nova Scotia, brought about by trade conditions: The eastern end of the Province ships almost entirely to the English deal market, and the western end to South America, the West Indies and the United States. The cut for the English market is three-inch deals, and that for the West, boards, plank, rails and scantling. The deals are carried largely by liners or tramp steamers, while the western part of the Province engages a large fleet of sailing vessels from 150 to 1,000 tons register, a favorable size for the West Indies being a vessel of from 300,000 to 400,000 capacity, and for South America, a vessel of from 500,000 to 1,000,000 capacity.

Summing up, Nova Scotia may be said to possess the following specialties that are peculiarly conducive to the carrying on of the lumber industry: It has the nearest spruce timber for shipment to the European market; it has a monopoly of the West Indian trade for cheap lumber; it has a natural reproduction of woods that can not be excelled for rapidity of growth and quality, owing to favorable rainfalls and climatic conditions; its lumber fleet is largely owned in the Province; the shipping facilities are excellent and inexpensive, and the principal ports of shipment are open all the year around.

Among the leading exporters of Nova Scotia are: Dickie & McGrath, Tusket; Parker, Eakins Company, Limited, Yarmouth; Rhodes, Curry & Co., Limited, Amherst; Alfred Dickie, Lower Stewiacke; Davison Lumber Company, Limited, Bridgewater; the Nova Scotia Lumber Company, Walton; Charles T. White, Apple River, and Clarke Bros., Bear River. The average annual output of the latter firm is about 8,000,000 feet. Alfred Dickie is an extensive operator having mills at Ship Harbour, Lower Stewiacke and other points and owning 40,000 acres of timber land, the standing timber on which is estimated at 40,000,000 feet.

The following figures will give an idea of the extent of the lumber operations in Nova Scotia and of the export: Total area of the Province, 21,428 square miles, or 13,713,920 acres; estimated timber and wood land, 7,500,000 acres; estimated export from western Nova Scotia, 110,000,000 superficial feet; estimated export from eastern Nova Scotia,

including Halifax shipments, 135,000,000 superficial feet; total export, 245,000,000 feet per annum.

The total value of the shipments of forest products from Halifax for the fiscal year 1903 was \$1,048,160, which included spruce and other deals, \$746,591; planks and boards, \$115,282, and scantling, \$34,797.

The Canadian census of 1901 gives the number of sawmills in Nova Scotia employing five hands or more as 228, the value of the product being \$2,940,107. The quantities and values of forest products were as follows:

SQUARE, WANey OR FLAT TIMBER.

	Quantity, cubic feet.	Value.
Ash.....	3,502	\$ 373
Birch.....	382,126	47,783
Elm.....	410	38
Maple.....	46,439	4,124
Oak.....	23,281	4,164
Pine.....	98,577	12,923
All other timber.....	356,371	39,697
Total.....	909,686	\$109,102

LOGS FOR LUMBER.

	Feet board measure.	Value.
Elm.....	25,000	\$ 233
Hickory.....	16,000	166
Hemlock.....	48,877,000	237,814
Oak.....	881,000	15,207
Pine.....	18,955,000	144,907
Spruce.....	198,892,000	1,272,653
All other logs.....	26,784,000	168,956
Total.....	294,430,000	\$1,839,936
Pulpwood (cords).....	18,343	48,320
Miscellaneous products.....		1,460,490
Grand total of values.....		\$3,457,848

TRANS-ATLANTIC SHIPMENTS FROM NOVA SCOTIA, SEASON 1902.

Ports.	Superficial feet deals, scantling, ends, boards, etc.	Tons timber.
Halifax, including Ship Harbour, Musquodobit and Tusket.....	97,101,000	1,807
Pugwash.....	18,714,051	
Parraborough.....	15,870,255	
Liscomb.....	11,260,816	
Yarmouth.....	6,621,000	
Pictou.....	4,138,346	
Total.....	153,700,468	1,807

SHIPMENTS OF DEALS, ETC., FROM NOVA SCOTIA TO TRANS-ATLANTIC PORTS.

Year.	Feet.	Year.	Feet.
1892.....	87,861,398	1898.....	148,239,804
1893.....	109,252,930	1899.....	128,009,504
1894.....	106,327,250	1900.....	146,294,110
1895.....	109,324,393	1901.....	182,000,386
1896.....	123,116,389	1902.....	153,700,468
1897.....	185,362,562		

NOVA SCOTIA EXPORTS IN 1904.

Districts.	Manufacturers and Exporters.	Available supply, acreage.	Annual export, superficial feet.
Annapolis Royal....	Pickels & Mills, Annapolis Royal, }	400,000	20,000,000
Bear River } Digby	Clarke Bros., Bear River, }		
Weymouth } St. Mary's Bay }	G. D. Campbell & Co., Weymouth.....	200,000	12,000,000
Yarmouth	Parker, Eakins Company, Ltd., Yarmouth, }		
Tusket	Dickie & McGrath, Tusket, }	750,000	25,000,000
	Blackadar & Co., Meteghan, }		
Port Medway } Bridgewater } Lunenburg }	Davison Lumber Company, Ltd., }	1,000,000	23,000,000
Shelburne.....	United Lumber Company, Ltd., }		
	Jordan River, }	350,000	10,000,000
Liverpool.....	McKay Bros., Clyde River, }		
	John Millard, Liverpool, }	200,000	10,000,000
St. Margaret's Bay.	Louis Miller, St. Margaret's Bay		
Wolfville }	S. P. Benjamin & Co., Wolfville, }	250,000	7,000,000
Hantsport }	G. W. Henderson, Halifax, }		
Windsor }			
Kingsport }			
Halifax.....	(See Special Report).....	2,335,000	63,000,000
Musquodobit.....	Musquodobit Lumber Co.....	150,000	
Ship Harbour.....	Alf Dickie, Stewiacke.....	140,000	
Sheet Harbour.....	Dominion Lumber Co., Sheet Harbour....	300,000	
Mosers River }			
Discombe	Alf Dickie, Stewiacke	125,000	
St. Mary's River.....	Alf Dickie, Stewiacke.....	150,000	
Stewiacke River.....	Alf Dickie, Stewiacke....	300,000	85,000,000
Pictou and Pugwash }	Primrose Bros., Pictou, }	500,000	20,000,000
	T. G. McMullen, Truro, }		
Parrsborough and E. Minas Basin }	Neuville Lumber Co., Parrsborough- Rhodes, Curry & Co., Ltd., Amherst, Chas. T. White, Apple River, Nova Scotia Lumber Co., Walton, St. Croix Lumber Co., St. Croix, }	350,000	15,000,000
Total.....		7,500,000	240,000,000

*NOTE.—Bridgewater exports will be increased to 50,000,000 feet in 1905.

It is evident that, with the limited acreage and the fact that the original forest has practically all disappeared, no material increase of the product is to be expected; but, conversely, with a climate especially favorable to tree growth, and a considerable area not adapted to agriculture, that lumbering will be always a chief industry.

EXPORTS OF LUMBER FROM HALIFAX, JANUARY 1 TO DECEMBER 1, 1904.

Superficial feet.			
W. Malcolm McKay.....	22,300,000	United States	1,500,000
Alfred Dickie.....	12,200,000	Lath	3,000,000
I. H. Mathers.....	10,000,000	United States	200,000
G. W. Henderson.....	1,800,000	United States	8,500,000
		Lath	9,000,000
Smith Tyrer & Co.....	4,000,000		
T. G. McMullen.....	2,000,000		
Estimate for December.....	1,000,000		
	52,800,000		
United States.....	10,200,000		
Exports for 1904	63,000,000	Lath	12,000,000
Exports for 1903	65,000,000	Lumber	10,200,000

The following table shows the amount of the different kinds of lumber shipped by five of the leading firms of Halifax, from January 1 to December 1, 1904:

Kind of lumber.	Superficial feet.		
	To Europe.	To United States.	Total.
Spruce.....	35,757,564	5,548,346	41,305,910
Hemlock.....	7,202,030	3,962,153	11,164,183
Pine.....	1,221,749	873,861	2,095,610
Hardwood.....	5,612,927	.....	5,612,927
Timber.....	* 68,273	.....	.....
Lath.....	.....	12,029,000	12,029,000

* This amount is in cubic feet.

CHAPTER XXIII.

PRINCE EDWARD ISLAND.

Nine miles off the coast of New Brunswick at its nearest point, lies Prince Edward Island in the Gulf of St. Lawrence. At one time it was covered with a considerable forest growth. It was visited in 1534 by Jacques Cartier on his first voyage to the new world. In the "Relation Originale," a description of Cartier's voyage, is found the following concerning Prince Edward Island:

"That day we coasted along the said land nine or ten leagues, trying to find some harbor, which we could not; for, as I have said before, it is a land low and shallow. We went ashore in four places to see the trees, largely of the very finest and sweet smelling, and found that there were cedars, pines, white elms, ashes, willows and many other to us unknown. The lands where there are no woods are very beautiful."

Despite Cartier's failure to find a good harbor, the present capital city of Charlottetown is located on one of the most excellent harbors of the Dominion. Georgetown, in King's County, situated at the juncture of the Cardigan, Montague and Brudenell rivers, was formerly called the "Port of Three Rivers," and was the center of the timber trade.

While the island once possessed forests of considerable area, these have been largely removed by forest fires, lumbermen and shipbuilders. At one time the island was quite generally covered with timber, but now all that remain are small growths of balsam, fir and spruce and even smaller quantities of pine, larch, maple, poplar, beech, birch and cedar. The total area of the island is about 2,184 square miles, of which 797 square miles remain in forest woodlands. Of this latter area at least forty percent is timber of merchantable size.

In 1903 a forestry commission was created by an act of the legislature. The Province receives no revenue from forest lands, but hopes to do valuable service in reafforesting denuded areas and conserving the remaining timber.

According to the census of 1901, relating to lumber products, there were in the census year eight establishments of that character in Prince Edward Island with an invested capital of \$223,500. These gave em-

ployment to ninety-five wage-earners and paid out \$30,772 annually in wages. The cost of materials employed was \$49,406 and the value of the annual product, \$118,150. The following affords a comparison concerning the lumber industry for a period of ten years:

MANUFACTURING INDUSTRIES EMPLOYING FIVE HANDS AND OVER, COMPARED FOR 1891 AND 1901.

	1891.		1901.	
	Establishments, number.	Value of output.	Establishments, number.	Value of output.
Log products.....	9	\$48,025	12	\$ 35,834
Lumber products.....	3	48,200	8	118,150

CHAPTER XXIV.

THE DISTRICT OF UNGAVA.

Historic association still gives the title of Labrador to the entirety of the great peninsula which forms the northeastern extremity of the North American continent; but, in its political significance, the name has applied since 1809 only to the narrow strip of coast along its eastern edge which drains into the Atlantic.

The Labrador Peninsula has been described as two and one-third times as large as the Province of Ontario, 65 percent of the size of all that part of the United States lying east of the Mississippi River, or nearly five times the area of Great Britain. It extends from the fifty-fifth meridian to the seventy-ninth meridian and from the forty-ninth parallel to the sixty-third parallel. It is contained within a nearly continuous water boundary—the Saguenay, Chamouchouan, Waswanipi and Nottaway rivers at the south, James and Hudson bays on the west, Hudson Strait and Ungava Bay on the north, the Atlantic Ocean on the northeast and the St. Lawrence River on the southeast. From Cape Wolstenholme, at the entrance to Hudson Bay, to the mouth of the Seguenay River the distance is 1,040 miles “as the crow flies;” from Belle Isle on the east to the mouth of the Nottaway River on the west the distance is more than one thousand miles. Roughly described, the peninsula forms a triangle one thousand miles long on each side.

Of the 560,000 square miles embraced in the Labrador Peninsula, the greater part lies within the district of Ungava, a Canadian territory created October 2, 1895. At the time of its organization on the date mentioned Ungava included a much larger area than that with which it is now credited. It embraced all of the Labrador Peninsula north of the Height of Land, exclusive of that part of the Labrador Coast which is a part of the jurisdiction of Newfoundland. Quebec, the province to the southward, which is itself largely a part of the Labrador Peninsula, later had its boundaries extended so that it acquired all that part of Ungava lying south of the East Main River on the west and the Hamilton River on the east. By this order in council Quebec secured a strip of territory which is 250 miles in width at its western end and includes the regions of the Rupert and Nottaway rivers and Lake Mistassini,

embracing important timbered areas. The following is the present area of Ungava: Land, 349,109 square miles; water, 5,852 square miles; total, 354,961 square miles.

This great Labrador Peninsula, the largest peninsula in the world, is of historical importance, for it was the scene of the discovery of America by white men. There is little doubt that its coast was touched by Norsemen as early as 1000. June 24, 1497, a year previous to the first continental discovery by Christopher Columbus (an Italian sailing under the Spanish flag) Giovanni Cabot, or Cabotto, a Genoese in the employ of the English, visited the eastern coast of North America; and in the following year Sebastian Cabot, his son, discovered Hudson strait. In 1500 Gaspar Cortereal, a little known Portuguese, landed and gave the name of Labrador, or "laborers' land," to the peninsula. In 1576 Martin Frobisher visited the region and in 1585-6-7 John Davis explored arctic Canada, including the vicinity of Labrador. To the westward, in Hudson Bay, occurred in 1611 one of the most tragic of the many tragic events linked with the story of the New World. Henry Hudson, the explorer, upon determining to winter in the region in order that he might continue his search for a northwest passage the following spring, was cast adrift in Hudson Bay with his seven-year-old son and seven seamen and died a miserable but unknown death.

The exploitation of the timber of Ungava has never been seriously attempted, beneficent natural conditions of climate serving to keep in reserve these timbered areas until the demolition of the forests farther south shall render the utilization of more northern forests necessary. The southwestern portion of that part of the peninsula contained within Ungava was early, however, the scene of extensive trading by the Hudson Bay Company, which had posts at the mouth of the Rupert River, at Great Whale River and Little Whale River and on Lake Mistassini and at other points in the interior. This company was incorporated in 1670 and was headed by Prince Rupert, a cousin of Charles II., of England. It had the exclusive trading rights on Hudson Bay. Two employees of the Quebec fur-trading monopoly, Groseillers and Radisson, conceived the idea of exploiting the Hudson Bay region. They failed successively to interest their own employers, a coterie of Boston merchants and the French court and finally had recourse to London, where the Hudson Bay Company was organized. It was capitalized at £10,500 and Prince Rupert and his seventeen associates received a charter May 2, 1670. This was granted to "The Governor and Company

of Merchants-Adventurers trading into Hudson's Bay" and gave the company the exclusive right to trade in the bay and on the coasts, power to expel trespassers on these rights and the privilege of building forts and fitting out privateers and armed ships for the purpose of making war on any non-Christian people.

From the time of its occupation until the present the company has been a potent factor in the history of Canada, no less in Ungava than elsewhere. In the district it gave the name to Rupert's River and established Rupert's House at the river's mouth early in its corporate existence. It established in the interior of Ungava in later years Mechiskun House, Waswanapi House and Mistassini House and, on the west coast of Ungava, posts at Great Whale River, Little Whale River and elsewhere.

While the early operations of the company were carried on with profit, they were never so large, in the earlier years, as to render these profits exceptionally heavy. In 1676 it handled £19,000 worth of furs, giving in exchange to the Indians £650 worth of goods. In 1748 the amount of business had increased to only £30,000 from which had to be deducted £17,000 for operating expenses and £5,000 for goods for the Indians. At that time the business required the employment of four ships and numerous garrisons. A French claim to the territory embroiled the Hudson Bay Company in difficulties from 1682 until 1713. In 1682 and 1686 the French captured several of the company's forts. These troubles were ended by the treaty of Utrecht in 1713 and thenceforward the company enjoyed prosperity. It was not until 1763 that the operations attained any great magnitude, however, and then they were vastly increased by the opening of all the Hudson Bay country by the session of French Canada.

The Declaration of Rights, which guaranteed free and open trade to all British subjects, produced the first serious competition which the company was forced to encounter. In 1782 the Northwest Fur & Trading Company was organized in Montreal. It invaded the old company's territory and the competition eventually became actual warfare. In 1821 these evils were cured by a union of the companies. The later history of the great enterprise concerns more particularly its westward progress.

It will be observed by this history of the operations of the Hudson Bay Company that a great fur trade was early developed in Ungava. The forests remained untouched, and in a consideration of the forestal

wealth of Canada the southern part of Ungava should be considered among its resources. Along the southern border exist important areas of hardwoods and from these forests the growth gradually lessens until the barren shores of Hudson Strait are reached.

The interior of Ungava is a plateau of less than 2,500 feet elevation and broken by a network of lakes and rivers which make water transportation in any direction possible. A portage of two or three miles will generally serve to move a canoe from one river to the waters of another. The plateau rises precipitously from the Atlantic Ocean at the east but slopes gradually to James Bay at the west. The longer rivers are, therefore, in the western part of the peninsula. The chief rivers of Ungava are the Koksoak and Leaf rivers, emptying into Ungava Bay, the Hamilton and Northwest rivers, flowing into Lake Melville, and the Great Whale and Mistassibi rivers, flowing into Hudson and James bays. Grand Falls on the Hamilton River has a drop of 302 feet and a volume of 50,000 cubic feet a second. The important lakes of Ungava are Mishikamau, Kaniapiskau, North Seal, Clearwater, Apiskigamish, Nichikun, Manuan and Payne.

The district of Ungava possesses a considerable forest area which will be of commercial importance when the provinces shall have been denuded. In the consideration of this forest ground, however, the northwestern projection of the peninsula may well be eliminated, as the forest is of no value. Even as far south as Richmond Gulf the region takes on the characteristics of the Labrador Coast, the hills rising abruptly 500 to 1,000 feet. These hills are barren on top, small trees growing only in the lower gullies and about the edge of the water. Clearwater Lake, to which reference has already been made, is in the same locality. It is thirty-five miles long from northwest to southeast and eighteen miles across at the widest point. The bare and rocky hills are clothed only with lichens and arctic shrubs. The trees about the lake are very small black spruce or larch. At North Seal Lake the trees are even smaller and the barren areas more extensive.

The chief forest areas occupy the valleys of the streams flowing into James Bay at the westward and the Atlantic Ocean and the Gulf of St. Lawrence at the eastward. This wealth has, unfortunately, been much lessened by forest fires which have, within the last quarter century, destroyed one-half of the timber of the interior. In some places this destruction has been so complete that two hundred years will be required to restore the soil to its old fertility. These fires are attrib-

uted generally to Indians. A. P. Low, of the Geological Survey of Canada, whose explorations of unknown Ungava have been highly valuable, says that the fires occur annually and often burn during the entire summer. In 1894 he wrote: "These fires are due to various causes but many of them can be traced to the Indians, who start them either through their carelessness or intentionally." However, settlers, tourists and hunters are equally culpable. Many of the fires may be traced to their lack of care in building camp fires in places carpeted with gummy leaves and resinous twigs. On the upper canoe routes notices printed in English, French and Indian have been posted at every portage. These appear to have had some effect.

Despite the destructiveness of forest fires and the barrenness of the northern part of Ungava, the district contains a large amount of excellent timber, particularly adaptable to pulp manufacture. Ungava forests embrace spruce, larch, balsam fir, scrub pine, poplar and birch, distributed according to the altitude, latitude, distance from the sea and character of the soil.

Black spruce (*Picea nigra*) constitutes 90 percent of the forest growth of Ungava and extends northward to Ungava Bay and Hamilton Inlet and westward to the sparse growth of Richmond Gulf, although in the northwest it does not exist in merchantable quantities. In the southern part of Ungava black spruce grows in thickets, which habit prevents it from obtaining any considerable size. Farther north the trees are more distributed and of larger girth.

White spruce (*Picea alba*) is found in smaller quantities throughout the peninsula wherever there is well drained soil.

Black larch (*Larix americana*), or tamarack, ranks second to black spruce in the extent of its growth. It also extends the farthest north of any of the Ungava trees, growing to a considerable height in regions so arctic that the spruce is stunted to a mere shrub. It is the largest of the trees found in the interior and makes the cold swamps its particular habitat. The European larch saw fly has been working northward in recent years and doing some damage to the tamarack growth.

The balsam fir (*Abies balsamea*) seldom grows farther north than the fifty-sixth parallel and is found in considerable quantities on the east shore of James Bay and eastward to Hamilton Inlet. It is particularly abundant on the lower Rupert River, where it grows in company with the white spruce, aspen and canoe birch.

Banksian pine (*Pinus banksiana*) variously known as the gray pine,

scrub pine, jack pine, Labrador pine and "cypress," has attained considerable growth on the burned-over area south of the Whale River and it is found in the swampy regions southward in the vicinity of James Bay.

The aspen (*Populus tremuloides*) grows south of the fifty-fourth parallel and is assisting to restore the burned-over areas. It conserves the soil on steep slopes and affords shelter to the seedlings of coniferæ.

The balsam poplar (*Populus balsamifera*) grows as far north as Clearwater Lake and is partial to the clay soil of the river valleys. It reaches a diameter of ten inches on the Kaniapiskau River.

The white, or canoe, birch (*Betula papyrifera*) is common to the southern part of the peninsula. It reaches ten inches in diameter at Hamilton Inlet, but up the river seldom attains more than eight inches. As it extends northward it is dwarfed in size.

As a source of future pulpwood supply Ungava takes important rank among the more northern districts of the Dominion of Canada. It is peculiarly well endowed with water power and means of water transportation and will eventually be the scene of extensive and profitable pulpwood manufacture.

CHAPTER XXV.

CANADA—ITS LUMBER INDUSTRY IN 1874.

History is a kinetoscopic repetition of events. It is interesting to stop the film of time occasionally and to view in detail the conditions prevailing during a particular period. It is for that reason that here is interjected a chapter showing with considerable detail the extent of the Canadian lumber industry in 1874. This chapter is drawn largely from an article prepared by a representative of the *Lumberman's Gazette*, a predecessor of the *American Lumberman*. The following is a pen picture of the Canadian lumber industry in 1874:

Canada, as a whole, must be regarded as possessing within her borders the most extended and connected chain of lumbering establishments in the world; and, from the location of her forests, adjacent to and facing the great continental markets, with such grand maritime facilities, we must pronounce them the most important, for the general markets, of any yet developed.

Respecting sensational documents prophesying a timber famine in the near future, which have been industriously put forth, it is sufficient to say that they have a tendency toward good by their restraining influence. But, in an excursion through the whole field, a mention of these prophesies will be promptly met with decidedly derisive ejaculations, the general expression being, "We have stock enough secured for our mills for fifty years or more," and that the mills now erected in Canada could cut their present yearly aggregate for that time and still have forests left. Exceptions in old districts will doubtless occur, but new ones are opening yearly, and forests yet unexplored for lumbering will be made accessible when required. In the North Simcoe section there are forty-nine mills of good construction, having 182,000,000 feet capacity yearly (rating low at that), which last year [1874] sent to Toronto 140,000,000 feet; and yet experts at woodcraft, thoroughly acquainted with these regions, say these mills (including other small ones) can be stocked probably fifty years longer.

We find, by careful computation of statistics given by parties of known credibility, that within the reach of these mills there is still of forest timber fit for the saw 4,550,000,000 feet of a merchantable character; also that the Georgian Bay mills, seven in number, have a still more extended and much less pillaged field to look to—all that region watered by the French, Spanish and other north shore streams, spread out many hundred miles, much of which country is yet unsurveyed and consequently unappropriated for any purpose. This section is estimated low at 20,000,000,000 feet, without including areas beyond those comprised within present explorations. It sent to the various points accessible by water no less than 90,000,000 feet in 1874, besides square timber. Its outlet is to Chicago, Buffalo

and Tonawanda, for the United States, and Collingwood and thence by rail to Toronto, for the Dominion. Taking the other side of the Bay, running over the whole of western Ontario, we have a vast area of settled country, with many small but high grade pineries interspersed, owned and protected by private parties, counting at least 2,500,000,000 feet, none too much for home supply, and not one foot of which should ever seek a foreign market. Yet twenty-nine mills, mostly of limited capacity, together with thirteen quite insignificant ones, send 70,000,000 feet of lumber and logs (embracing some square and spar rafts) to Cleveland, Erie, Buffalo and Tonawanda.

The above area includes the coast down to the lower wharves of Toronto, from whence we may take a run up the route of the Lake Nipissing railway and find a fair sweep of territory covered with fine forests, much of which is yet untouched and can not be utilized until the road is completed to its proposed terminus at the lake, where it is supposed it will be in line with the Great Pacific. The forests on this line are estimated of sufficient value to induce a board of astute capitalists to make a large outlay of money. Yet, from a cursory glance at the timber, we judge its grade scarcely warrants present handling, if immediate pecuniary margin is the object of the operators. The 11,000,000,000 feet which this division proposes to throw into the great aggregate of forest product will count with good results, if the cutting of it is not too hurried. This road is already constructed nearly ninety miles, and has drawn to it a considerable outlay in mills, about thirteen in number, mostly of small capacity, which sent to Toronto in 1874, 15,000,000 feet; and this will increase year by year, as other and larger mills are constructed.

Proceeding along the shore line of Ontario past Ports Whitby, Hope, Coburg, Trenton, and Belleville to Kingston, thence backward into the outlying country, embracing that extended chain of waters known as the Rice and other lakes, including the Trent, Moira, Scugog, Otonabee, Marmora, Napanee and other smaller rivers, reaching 150 miles toward the Grand Ottawa, we have a large area of country rich in timber, villages, farms and even iron and gold. Many first class sawmills are in operation, while the streams, many of them navigable to small steamers, are filled with floating logs and square timber for the use of mills all along the front. Several competing railroads cross each other within this stretch, having the posts before named, the large interior towns and the forests for objective points. Although it has been settled and worked for fifty years or more, the country still has many valuable timber precincts, which, although largely run over by the spar hunter and hewer, yearly send a vast amount of the same class of product, with logs and lumber, to the market. This product counted in 1874 285,000,000 feet, and the same grounds are computed to possess yet 7,750,000,000 feet for stock for her fifty-seven mills. This section has had the repute of yielding as fine a grade of stock as any portion of Canada, and holds its own very fairly in that particular.

The country in the rear of Kingston, Brockville, Prescott, Cornwall, etc., is also of great importance, as being the location of thirteen good sawmills, whose yield for 1874 was 106,000,000 feet of a good quality, together with considerable hardwood and basswood, while there remains on the main streams 2,250,000,000 feet of good, marketable pine, beside no mean amount of other woods of but little less value.

In all this stretch of country there is no thought of catering to other than the

United States trade, save in the sections where a portion of the square and spar timber goes to Quebec and thence to Europe. We have not herein intrenched upon groves on streams that flow to the grand center, Ottawa. It will doubtless be a surprise to many, even in Ontario, to learn that on these grounds, many of which have been long worked, there remains tributary to the Great Lakes the amount of 45,550,000,000 feet. Yet Ontario is sparsely settled, and in all that vast range all was originally forest and water, with no prairie. Remembering this, the investigator is led to think that there should be even more timber than we have counted, and we think the future will prove that there is more. The country we have been considering extends 750 by about 436 miles, making 327,000 square statute miles, equal to about 209,280,000 acres in area.

We approach Ottawa City next, as the great lumber and mill center. We find here, within a radius of about ten miles, twenty-four mills, nearly all of superior grade, embracing over a hundred gangs and six large circulars. These mills represent a capacity of over 400,000,000 feet annually, without night work, and have such timber limits attached to each establishment that scarcely one of them need have any fear of lack of stock for the next twenty-five, fifty, or one hundred years, even if an enlarged demand should decide them to run the whole twenty-four hours. Although many of these mills are located in Ontario, still they draw nearly all their stock of logs from Quebec. The Grand Ottawa is the dividing line between the two provinces. It receives from both sides a very large number of extended water courses, which drain an immense territory of densely timbered land. These mills have been erected mostly for, and are run to subserve, the American market, yet they annually contribute something to the European trade.

The Grand Ottawa is a very large and important river, over 750 miles in length, and draining an area of 80,000 square miles. It receives many tributaries varying from 100 to 400 miles in length. The whole valley has been, and is now, mostly covered with dense forests of white pine and red pine, and is held or allotted by the Government as timber limits, with but small exceptions. Besides furnishing stock for these mills, vast quantities of logs are cut and run to Montreal and other mills scattered along the St. Lawrence engaged in cutting deals. This is the great source from which the large timber houses and other concerns of Quebec draw their supplies for the European trade. It is estimated that the Gatineau alone can send to Ottawa over 12,000,000,000 feet, the Madawaska 4,000,000,000, the Upper Ottawa waters 75,000,000,000, the Riviere du Lievre to the mills below 4,000,000,000, all of a good quality of white pine and red pine. The spruce and hemlock timber seem boundless and, although not now regarded of much value, will eventually be the basis of more real wealth than the pine has been, if not ruthlessly destroyed by man or fire. All these sections, though showing large by the figures above, will doubtless yield through the same channels, from adjacent higher lands and more northern regions when necessity demands it, enough more to duplicate their present claims.

The Ottawa region, unlike the other sections, occupies an enviable position, inasmuch as it has the privilege of choosing the best of three different markets and can ship to them all by water conveyance—to the United States, to Europe, or to South America and Australia. This region has such superb mill establishments and does the work of cutting in such a neat style that it often gets fancy prices for

even a low grade article, because it looks well in bulk. Though its reserve stocks are 30,000,000 feet less than they were in 1873, and the cutting in the woods is exceedingly light, the harbors of this section being filled with held-over logs, members of the trade will be able largely to increase the aggregate for 1875 over that of 1874. It could be done to the extent of 100,000,000 feet if the demand should warrant it. These millmen, with those of the Lower Ottawa, and with the St. Lawrence operators, being in financial circumstances above panic influences, generally can watch and wait, or work as pleases best, and, having no burdens resting upon them in the shape of timber land taxes or interest, they can well afford to rest a season or two if exigencies require. These firms could put into the market for 1875, 450,000,000 feet without straining a single nerve, and the St. Lawrence mills could add 50,000,000 and make the sum 500,000,000, which, however, is not proposed by either party. But there is one feature regarding the Canadian forest product of which sight should not be lost. The square timber trade received such a rude shock that many of the houses have utterly refused to go into the woods at all this winter, which will have a tendency to clean out the stocks on hand and, doubtless, diminish the amount marketed considerably; and, as much of that wood is put into deals after it arrives in Europe, its loss may be required to be made good by the manufacturer.

The river St. Maurice is one of the largest of the St. Lawrence tributaries, and drains an immense scope of country. It is over 400 miles long, receives the waters of fifteen important rivers and numerous lakes, and is supposed to drain a widespread territory of pine, spruce and hemlock timber of great value. The Government claims to have yet on its waters over 3,000,000 acres of unallotted timber lands, on which, if we give but 3,000 to the acre, we have 9,000,000,000 feet outside the leased limits. Gaspé and Bonaventure counties are claimed to have 3,000 square miles of timber limits yet waiting lease, abounding in sawing timber, which, by applying the same rule, will add 6,000,000,000 feet.

The estimate so far gives over one hundred years' stock for all the mills now working in the two provinces, yet, to show the probable accuracy of these details, we will state that Quebec records show in 1872, 192,000 square miles reserved for timber limits, and at that time an allotment of 42,399 square miles had been made, leaving unleased land as follows:

Six thousand square miles St. Maurice territory; 2,000 in the Gatineau; 3,000 in the Upper Ottawa; 139,000 in other sections of the Province, including Gaspé, Labrador, etc. In other words, they say they have 149,000 square miles of timber land to lease; and, if we can award to them 3,000 to the acre, or about 2,000,000 to the square mile, we get 298,000,000,000, which is nearly three times the amount we had set down for the different sections en route, and yet we do not intrench upon the 42,399 square miles allotted. It is no more than reasonable to surmise that no practical millman or lumberman would purchase timber limits, and thus subject himself to a yearly rental for twenty-one years, without first ascertaining that such limits were worth the purchase. Therefore, if we give these men credit for common business tact, we must suppose their 42,399 square miles, or 27,135,360 acres, must yield at least 3,000 feet to the acre, less the amount cut off since their occupancy. This would give an additional amount of 81,406,080,000 feet, which we reduce by 15,000,000,000 as the amount cut off 5,000,000 acres, leaving 66,406,-

080,000. All this, it will be remembered, does not touch the Algoma, nor the Northwest Territory, which we know, from actual exploration, is very extensive and will come in for use when needed, though generations may pass before that time arrives. Neither does it embrace the amount assumed to be still in the Ontario forests, that being about 45,550,000,000 feet.

RECAPITULATION.

	Feet board measure.
Ontario forests.....	45,550,000,000
Quebec, allotted limits.....	66,406,080,000
Quebec, not allotted.....	298,000,000,000
Aggregate	409,956,080,000

If the Government basis is correct those lands will yield all these figures have assumed for them. But it should be stated that the Gaspé and the St. Maurice territory, and what may be left on the Saguenay, embrace the spruce and hemlock as well as the pine. In that region those woods may be regarded as possessing a commercial value equal to the Upper Ottawa pine on its stump. On looking over the whole domain of the Dominion we would be surprised, indeed, if it did not furnish 500,000,000,000 feet of sawing stock, knowing what some of the sections that have been cleared have yielded.

The year 1874 was the occasion of a sharp and sudden decline in Canadian lumber values. At the opening of the season in 1874, about June 10, the following were the prevailing prices in Canada, a standard deal making 2,750 superficial feet to 100 pieces:

Pine standards, firsts, \$108, or \$39.28 per M feet board measure.
 Pine standards, seconds, \$72, or \$26.19 per M feet board measure.
 Pine standards, thirds, \$306, or \$13.09 per M feet board measure.
 Pine standards, fourths, \$28, or \$10.19 per M feet board measure.
 Spruce, firsts, \$44, or \$16 per M feet board measure.
 Spruce, seconds, \$36, or \$13 per M feet board measure.
 Spruce, thirds, \$28, or \$10.18 per M feet board measure.
 Spruce, fourths, \$28, or \$7.27 per M feet board measure.

These prices fell off fully ten percent during the season. At the opening of 1874 pine sold at 35 cents to 20 cents per cubic foot, oak at 47½ to 50 cents, elm at 37½ to 40 cents, and walnut at 80 to 85 cents. All of these, except the walnut, fell off 12 percent in price during the summer. At that time the production of square timber was made up of about three-quarters pine, of which one-twelfth was red. Hardwoods manufactured embraced oak, ash, birch, basswood, white tamarack, walnut, maple and hickory. Spruce and hemlock represented about one-sixth of the total production, but the proportion has since very largely increased.

The following is a comprehensive statement of the extent of the lumber industry of Canada in 1874, the names¹ of manufacturers and the location and capacity of their mills being given:

¹ The spelling of the names appears incorrect in many instances, but changes have been made only in a few cases that were known absolutely. The editor does not wish to be held responsible for the spelling of these names in this excerpt.

NAMES AND LOCATION.	Thousand feet.		
	Product.	Held over.	Cutting of logs.
J. Chaffer, Spanish River.....	5,000	2,000	3,000
R. Christy, Byng Inlet.....	8,000	5,000	4,000
Brashear & Caster, Sunnydale.....	4,000	2,500	3,000
C. Cook & Co.....	3,000	1,500	2,000
Printiss, New Lowell.....	3,500	2,000	3,000
Smith & Doby, Mad River.....	3,500	1,500	3,000
J. Mercer, Angus.....	2,000	500	3,000
J. Davidson, Angus.....	3,000	1,000	2,000
S. Fish, Angus.....	2,500	750	3,000
W. W. Colwell & Co., two mills, Harrison's Landing.....	7,500	2,000	6,000
N. Diamond, Allendale and Barrie.....	6,500	1,750	3,000
J. Williamson, Hawkestone.....	1,000	250	1,000
Fish & Co., Orillia.....	2,000	500	3,500
James Budd, Orillia.....	2,000	.....	2,000
R. R. Wier, Orillia.....	2,500	1,200	1,000
J. Thompson & Co., Longford.....	8,000	2,000	7,000
Smith & Ball, Swerne Bridge.....	4,000	1,000	5,000
M. Warren, Orillia, Warracaster.....	1,000	200	2,000
Pauby, Marchmont.....	500	.....	2,000
Wm. Snyder, Atherly.....	2,000	500	2,000
Stewart, Orillia.....	1,500	500	2,000
J. Banger, Crayville.....	1,500	5,000	3,000
Sullivan, Belle Ewart.....	9,000	2,000	5,000
Thompson, Smith & Son, Bradford and Barrie.....	20,000	5,000	2,000
Hall & Landing.....	1,500	500	2,000
C. & S. P. Lewis, Aurora.....	1,000	500	2,000
Peckham & Hoag, Stayner and Newmarket.....	5,000	1,000	5,000
R. & W. Henry, King.....	800	.....	1,000
Hotchkiss, Peckham & Co., Collingwood.....	12,000	3,000	8,000
D. Davidson, Penetanguishene.....	3,000	1,000	3,000
Jas. Plews, Wye.....	1,000	500	2,000
Cook Bros., Wye.....	8,000	3,000	9,000
Kane, Fawcett & Co., Wye.....	3,000	2,000	2,500
Sturgeon Bay.....	1,000	250	1,500
Four mills formerly belonging to Dodge & Co., Wautauskene.....	12,500	3,000	9,500
Parry Sound L. Co., Parry Sound.....	10,000	3,000	13,000
Houghson & Co., Muskoka.....	6,500	4,000	6,000
St. Michaels Bay.....	2,000	1,500	1,000
Geo. Caswell, Coldwater.....	1,000	750	1,500
E. R. Cook & Co., Nipissing railroad and other mills in that locality by two mills.....	19,250	4,000	22,000
Payson, Bigelow & Town, Port Perry.....	4,000	1,500	4,500
W. S. Saxon, Port Perry.....	2,000	500	2,000
Needlar & Sadler, Lindsay.....	3,000	750	2,000
Thos. Free, Lindsay.....	1,500	.....	3,000
S. Trudn, Lindsay.....	10,000	.....	.....
Bond, Downes & Co., Lindsay.....	3,000	1,000	4,000
Strickland, Lindsay.....	4,000	1,000	3,000
Jabez Thurston, Lindsay.....	500	.....	1,000
McDougal, Peterborough and Rice Lake.....	15,000	2,000	10,000
J. Z. Rogers, Peterborough and Rice Lake.....	2,000	.....	4,000
Ulyott & Sadler, Peterborough and Rice Lake.....	6,000	2,000	8,000
Geo. Hilliard, Peterborough and Fenelon Falls.....	8,000	3,000	6,000
Boyd, Smith & Co., Peterborough and Bobcaygen.....	12,000	3,000	8,000
Dixon Estate, Peterborough.....	3,500	1,000	4,000
Shaw, Peterborough.....	1,000	.....	2,000
Benedict (Scott Mills), Peterborough.....	8,000	1,500	7,000
A. H. Campbell, Peterborough.....	3,000	2,000	3,000
Hilliam & Mowry, Fenelon Falls.....	5,000	150	4,000
Smith & Co., Fenelon Falls.....	10,000	1,000	8,000
Green & Ellis, Fenelon Falls.....	4,500	2,000	5,000
J. Armstrong, Millbrook.....	2,000	500	2,000
Wm. Pratt, Trenton and Near.....	2,000	1,000	3,000
Gilmore & Co., Trenton.....	20,000	8,000	10,000
Baker, Jones & Co., Page Island mill and Belleville.....	13,500	3,000	2,500
Baker, Jones & Co., Belleville.....	8,000	1,000	.....
Rathburn & Sons, Belleville.....	8,000	3,000	7,000
Rathburn & Sons, Mill Point.....	20,000	4,000	16,000
H. B. Rathburn & Sons, Napanee.....	4,000	1,000	2,000
Baker & Stewart, Belleville.....	6,000	2,000	4,000
Flint & Huttan, Belleville.....	7,250	2,000	8,000
W. Bleeker, Belleville.....	2,000	500	2,000

NAMES AND LOCATION.	Thousand feet.		
	Product.	Held over.	Cutting of logs.
W. A. Foster & Co., Belleville.....	1,500	500	2,000
F. Walbridge, Belleville.....	2,000	500	2,000
Jones & Van Dusen, Belleville.....	6,000	1,000	6,000
Lewis & Kerr, Belleville.....	2,000	1,000	2,000
John Ross, Belleville.....	500	.....	.....
A. Southerland, Caniffton.....	2,000	500	2,000
Sills, Caniffton.....	2,000	500	2,000
John Chaffer, Kingston.....	2,500	1,500	2,000
W. H. Freelanberg, Westport.....	2,000	500	2,000
Peter McLaren, Carltonplace.....	15,000	14,000	17,000
Boyd, Caldwell & Son, Carltonplace.....	8,000	5,000	5,000
McLaren & McCrea, Carltonplace.....	2,500	2,000	2,000
Gillis & McLaren, Carltonplace.....	10,000	4,000	dis'd
Gillies Bros., Braeside.....	8,000	9,500	.....
Hillard & Dixon, Pakenham.....	3,000	2,000	2,000
McKillop & Gordon, Paltenham.....	2,000	500	2,000
Capt. O'Neal, Paltenham.....	2,000	1,000	3,000
Geo. Playfair, Fallbrook.....	1,500	900	2,000
William Lus, Fallbrook.....	1,500	750	2,000
J. S. Playfair, Playfairville.....	4,000	1,100	3,000
A. Caldwell & Son, Lanark.....	4,000	4,000	2,000
Jas. McCuren, Arnprior.....	2,500	500	6,000
McLachlin Bros., Arnprior.....	12,500	2,500	3,000
Mallock & Adams, Arnprior.....	2,000	750	3,000
McDonald, Sand Point.....	2,000	1,000	1,000
Ward & Scott, Sand Point.....	1,000	.....	2,000
Bran, Sand Point.....	1,000	500	2,000
J. G. Campbell, Perth.....	4,000	1,000	6,000
Gillies Bros., Perth.....	3,000	.....	2,000
J. Jackson, Perth.....	2,000	500	2,000
W. Steadman, Perth.....	1,000	250	2,000
Perley & Pattee, Ottawa.....	21,000	9,500	18,000
J. R. Booth, Ottawa.....	22,000	12,500	12,000
Bronson & Weston, two mills, Ottawa.....	30,000	3,000	15,000
A. H. Baldwin, Ottawa.....	15,000	6,000	7,000
Levi Young, Ottawa.....	10,000	5,000	5,000
Balson & Currier, [Hull] Ottawa.....	16,000	1,000	15,000
H. Crandall & Co., [Hull] two mills, Ottawa.....	7,000	2,500	8,000
Jas. Skead, Nepean Mills, Ottawa.....	14,000	9,000	6,000
Conway Estate, Ottawa.....	13,000	4,000	5,000
J. McLaren & Co., Ottawa.....	12,000	1,500	7,000
Weich Bros., Ottawa.....	7,000	2,500	3,000
Gilmore & Co., Gatineau and Hull, two mills, Ottawa.....	50,000	11,000	30,000
E. B. Eddy, Hull, Ottawa.....	55,000	20,000	35,000
John Rochester, two mills, Ottawa.....	15,000	3,000	14,000
McClymount & Co., New Edembro, Ottawa.....	6,000	3,000	2,000
Jas. McLaren & Co., Buckingham.....	6,000	4,000	15,000
John Ross, Buckingham.....	15,000	1,500	4,000
Buckingham Mfg. Co., Buckingham.....	2,000	500	.....
Blackman & McLaren, Impleton.....	1,250	250	2,000
W. E. Edwards & Co., Rockland.....	6,000	3,000	7,000
J. A. Cameron, North Nation.....	4,000	2,000	9,000
D. A. Cameron & Co., North Nation.....	6,000	3,000	8,000
J. Norden, Greenville.....	10,000	2,000	10,000
Hamilton Bros., four mills, Hawkesbury.....	3,000	2,000	20,000
I. R. Ward, Montreal.....	5,250	3,500	6,000
Hall & Co., L'Assomption and Huntertown.....	11,000	7,000	13,000
Wm. Henderson, Montreal, two mills.....	3,500	3,500	4,000
McGauvran & Tucker, Montreal, two mills.....	12,000	6,000	12,000
Jas. Coulin, Montreal.....	2,000	500	2,000
Cushing Bros., two mills, Montreal.....	9,000	4,500	10,000
Jas. Little, Montreal, Maskinonge.....	3,000	500	12,000
Geo. Baptist & Sons, Three Rivers.....	5,000	8,000	20,000
L. Tourbelle, Montreal, Pierreville, St. Francis, two mills.....	2,000	5,000	10,000
Boyer, Houdon & Co., two mills, Ursula.....	.....	500	4,000
F. McCarty, Nicholet.....	500	1,000	3,000
J. Wilson, Gautham.....	4,000	1,000	5,000
A. Senecoe, So. Guilleme.....	2,000	500	4,000
Geo. B. Hall, six mills, Somerset, Krugale, Warrick, Stamford, Romoskie, Montmorencie.....	6,000	12,000	60,000
Mr. Tayton, Point Levi, (leased of Hall).....	1,000	.....	4,000
Bennett & Benson, Quebec.....	1,000	2,000	15,000

NAMES AND LOCATION.	Thousand feet.		
	Product.	Held over.	Cutting.
Ross Richie, Nicholet.....	2,000	1,000	22,000
A. Mayrand, Nicholet.....	3,000	1,000	8,000
Price Bros., Batiscan.....	2,000	3,000	10,000
Price Bros., St. Thomas, Metis, Sagancey, So. Du'Cashon.....	6 000	2,000	40,000
Total.....	864,000	830,250	855,000

The mills enumerated above manufactured, during 1874, in the aggregate, 112,000,000 deals for the European market.

In addition there are seventy-three mills about and below Quebec which stock almost exclusively for the European market, or the South American and Australian trade, though we find among their product 23,000,000 feet that might, if the demand were good, go to the United States. This stock was made, doubtless, for the southern trade, and, that call being already overstocked, it has mostly been held in reserve. To show the cause, we find the South American, etc., shipments in 1874 have been but 16,975,000 against 41,044,000 in 1873, while nothing to speak of has gone to Australia.

RECAPITULATION OF CANADA PINE LUMBER, DEALS, TIMBER, ETC., FOR 1874.

Stock and siding boards produced by mills enumerated.....		Feet board measure. 864,000,000
Stock and siding boards produced by mills not enumerated.....		23,000,000
Total of United States market.....		887,000,000
Amount of same grades held over from 1873.....		846,000,000
Amount on the market for 1874.....		1,233,000,000
Amount being held over from above mills.....	830,250,000	
Amount being held over from other mills.....	17,750,000	848,000,000
Amount of foreign sales.....		685,000,000
Pine deals produced by above mills.....		243,000,000
Pine deals by other mills.....		173,000,000
Pine deals held over from 1873.....		80,750,000
Amount on the market.....		496,750,000
Amount now in reserve.....		150,750,000
Amount sold and shipped.....		846,000,000
Approximate pine timber made in 1874.....		192,000,000
Approximate held over in 1873.....		84,000,000
Approximate amount on the market.....		276,000,000
Now in reserve.....		73,000,000
Amount of pine timber sold and shipped.....		203,000,000
Total pine shipped from the two provinces approximated.....		1,424,000,000
This falls 200,000,000 short of the shipments for 1873.		

In preceding chapters of this history the reader has found figures epitomizing the production of lumber in the districts above named in years later than 1874. A comparison will show the changes in the industry in Canada between 1874 and 1905. Many names of importance in 1874 will be found to have been still prominent in 1905.

CHAPTER XXVI.

UNITED STATES—FOREST RESOURCES.

The beginning of the Twentieth Century marked, with approximate accuracy, an epochal period in the timber and lumber history of the United States of America. Until that time the country, in its use of forest products, had been drawing upon a surplus, but thereafter a continuance of production on the former scale, without adequate care for the perpetuation or reproduction of the forests, necessarily would draw upon the capital fund, so to speak, with the inevitable result of a growing scarcity of forest products, or, to be more exact, of an increasing and manifest deficiency in the supply of standing timber from which the product must be secured.

Not only were the forests in surplus supply; that is to say, occupying a greater territory and in larger quantity than were necessary, provided their natural growth should be maintained, to supply in perpetuity the national requirement, but they were, especially during the period of development up to about 1850, in many instances a positive detriment. Forests stood on millions of acres of fertile lands which were needed by the settler and the would-be farmer, and a slow-growing crop of timber was occupying land that might more profitably be devoted to the annual production of grain or other products of agriculture.

Unfortunately there has never been a timber census of the United States, nor even any very trustworthy estimate either of acreage or volume; but the best informed students of the subject believe, after as careful investigations as they have been able to make, that the forests yet remaining, if operated along conservative lines, would annually produce in perpetuity an amount of forest products little, if any, more than the present annual output. If that be true, the United States has come to the point where it can no longer be lavish in its use of its wonderful timber resources, but must rigorously conserve them. It no longer will be consuming a surplus, but, except for the adoption of forestry methods, will be drawing upon its capital.

It seems fitting therefore, that, at such a turning point in the life of this great and fundamental industry, a study should be made of its his-

tory in order that those concerned—and every one is directly or indirectly concerned in this subject—may look forward from the vantage point of knowledge and recorded experience. To afford such a vantage ground is one of the objects of this work, which must be a record not merely of men and of events, but also of conditions.

In previous chapters we have outlined the forestal condition of the North American continent and of the present United States as it was when the white race began its work of discovery, exploration and conquest. But it is necessary to go more minutely into the subject in this chapter than heretofore.

In undertaking to state with some definiteness the original location, extent and quality of the forests within the present area of the United States, the historian is confronted with a task impossible of complete execution. The available records do not show with preciseness the limits of the forested areas nor the exact location and size of the treeless areas within them, and the research and exhaustive personal work necessary to determine these facts would, perhaps, not be worth the while. But it is possible to give an outline of these primary facts sufficiently exact to serve the purpose of comparison and, perhaps, to accomplish all that is desirable in this connection.

Further, it is necessary to determine, with as much exactness as possible, the present forestal condition of the country, and to measure its timber resources. This task is as more difficult than the former one as it is more important. Upon it many able investigators have centered their attention, and yet, so inadequate and incomplete are the data, that no certain result is to be obtained—only an estimate more or less reliable according to the personal knowledge of the estimator and the thoroughness and skill with which he collects the available facts and draws his conclusions. The personal equation must be considered also. With the best of intentions the pessimist and alarmist will underestimate the amount of standing timber, and so exaggerate the seriousness of the exigency. On the other hand, the optimist is likely to magnify the favorable facts and minimize the unfavorable ones.

It is the endeavor in this chapter to avoid either extreme and to reach conclusions through no other means than an impartial study of the existing and recognized facts and a study of the methods, arguments and conclusions of those who have hitherto undertaken this task.

FOREST ENVIRONMENT OF EARLY EXPLORERS.

To those discoverers and explorers who approached the United

States from the East the forests seemed illimitable. True, the French explorers, like Marquette, Joliet, LaSalle and Tonti, found in the Mississippi Valley extensive prairie areas, but it is doubtful if they saw many of these, for their travels were as far as possible by water, and the waterways were always adorned and sheltered by trees; and, further, they did not go into the true plains country, for Illinois was nearly or quite half covered with forests, and eastern Iowa in those early days indicated little of the real character of most of the area of that great State.

Those who approached the continent from the Pacific found wide, open valleys, sterile mountain tops and barren plains, but the coast itself extended the welcome of the forest, and the valleys and the peaks were bordered or surrounded by forests which today are the wonders of the arboreal kingdom. It was only the Spaniards who, like Coronado, entered the country from New Spain, that encountered the great treeless plains. While, therefore, it was soon a matter of common knowledge that in the remote West there were treeless and even desert areas, the colonists on the eastern coast—those to whose labors is due the foundation of that great community which later became the United States—personally knew only of the forest, which, so far as their own explorations informed them, stretched indefinitely into the interior. Months of travel and hundreds of toilsome leagues did not serve to release them from the forest environment. Therefore, to the settler the forest, although a protection and a support to the hunter and trapper, became an enemy to be fought and conquered before a higher civilization could be established.

DIVISIONS OF FOREST AREAS.

From the time of the first exploration and settlement of the United States until the present, there has been comparatively little change in the location and outline of the areas that may be called wooded. Notwithstanding the clearing of hundreds of thousands of square miles, so that the passengers on the railways may now travel for hours without seeing more than occasional groves or groups of woodland where once a continuous forest shaded the soil, the characteristics of the timber soil still remain. The greatest changes have, perhaps, been in the prairie region, where windbreaks and wood lots now abound and break the monotony of a landscape which once interposed no obstacle between the eye and the circling horizon. Though no census relating to the facts has been made, it is a matter of common knowledge that in

such states as Kansas and Nebraska the wooded area is much greater now than at any previous time, and is steadily increasing as the owners of the land come to a better appreciation of the value of trees in aspects other than as furnishing a lumber material. But, notwithstanding these local changes, the outlines of the forest areas continue to be marked by the remnants of the once continuous woodlands, while within these limits still exist magnificent forests and, though much land has been devoted to agriculture and much lies waste, the growth of trees in the soil and climate to whose invitation they most generously respond has done much to maintain the forest industries.

Some students of American forestry divide the forest area of the United States into three grand divisions. One they call the eastern forest; another, the Rocky Mountain forest, and the third, the Pacific Coast forest. The eastern forest is that originally continuous growth which reached from the Atlantic to the Mississippi and beyond, broken toward its western boundaries by the incursion of the prairies. The Rocky Mountain forest is that broken and usually scattered growth found in the dry climate and on the often sterile soil of the Rocky Mountains and their foothills, while the Pacific Coast forest is that lying west of the summit of the Cascade and Sierra Nevada ranges, with some extensions to the east.

A more logical division would, however, seem to be that which divides the forest area into two grand classes known as the Atlantic and the Pacific, or the eastern and the western. This classification is the more logical because it rests not upon more or less arbitrary geographical or topographical considerations, but because it recognizes the essential differences in species characteristic of the two divisions.

The Atlantic forest is essentially broad-leaved in its type, while the Pacific forest is coniferous and needle-leaved, and there are comparatively few species common to them. Excluding tropical species, the Atlantic forest has 199 species of broad-leaved trees, many of which grow in profusion and are of immense economic value, while the Pacific forest has only 106 species, few of which are of any considerable value. On the other hand, the Pacific forest has sixty-five species of conifers and the Atlantic forest but twenty-nine, only one of which is common to the two. The conifers of the Atlantic Coast occupied extensive areas and were of the highest economic value, but in territory covered the broad-leaved trees far exceeded them and would either mix with the conifers or penetrate their strongholds through river val-

leys or by occupation of particularly favorable soils throughout their range. Thus, either in the white pine forests of the North or the yellow pine districts of the South, the woodsman was never far removed from broad-leaved growths which were of moment in reckoning the forest wealth of the section, while in the Pacific forest the conifers occupied vast stretches of territory to the exclusion of all others, and the broad-leaved trees, when found, were in comparison insignificant and seldom of much value as a material for the sawmill.

The great interior plains and prairie region of the continent serves effectually to divide and keep separated the two types of forest. This is true despite the fact that in some places they meet and mingle. The Atlantic type, reaching with some species far into western Texas, meets there species typical of the Pacific forest and also of the arboreal flora of Mexico. Further north the Atlantic forest, stretching out "feelers," as it were, along the rivers and creeks into the plains region meets, as in the Black Hills of South Dakota, outposts of the Pacific flora; and toward the northern limits of both forests, in the British possessions, they came together in one great stretch of continuous woodland, reaching from the Atlantic to the Pacific, with some species of subarctic adaptabilities which reach from ocean to ocean.

THE PRAIRIES.

The explanation of the existence of the prairie regions and of the grassy plains of the United States has been the subject of much investigation. It has been presumed by many, in view of the fact that the soil is adapted to tree growth and that, under the influence of occupation by agriculturalists, trees are spreading west of the Mississippi, that at some time these vast fertile areas were covered with forests. There is no disagreement of opinion about the semiarid regions where the vegetable growth is scanty and of few varieties. In those regions, and particularly in the alkali plains and sinks, it is evident that the conditions forbid the growth of trees, but it is only recently that anything like an agreement has been reached as to the grassy plains and prairies.

It has been the theory of some that fire set by the aboriginal inhabitants year after year, generation after generation, destroyed and crowded back the forests. But if this had been the case some marks of their existence would have remained. The peculiar mounds left by the overturning of large trees by wind, particularly if they are protected by grasses from erosion, are not readily obliterated. Indeed, it is probable that they would persist for hundreds or thousands of years. But

the genuine prairie regions have no such evidence of former occupancy by forests. Again, the debris of forest growth persists indefinitely. Trunks of trees become buried in marshes or are covered with alluvial deposits and thus are preserved. No such remains, nor the impression of trunk, branch or leaf, have been discovered in most of those regions which were treeless at the beginning of white settlement. The conclusion has been almost universally accepted, therefore, that another cause must be looked for to explain the absence of forests from those great areas, so fertile and now agriculturally productive.

Other influences dictate the presence or absence of forests. First may be reckoned soil. There are soils in which trees will not grow, but this influence is comparatively unimportant, for there are few soils in the United States so sterile or poisonous that, if other conditions are favorable, some tree will not adapt itself to the conditions. The second is mean temperature. Henry Gannett, in a monograph on "The Timber Line,"¹ after a careful study of the height of the treeline on the mountains of both the eastern and western parts of the United States, verifying the deduction thereby drawn by the conditions in the far north of the continent, states that the mean annual temperature of the timber line is two to three degrees below the freezing point and that this temperature limitation of tree growth obtains regardless of altitude. He says: "The ultimate and primary cause of the cessation of forest growth at great altitudes on mountain sides is to be sought for in temperature. This upper limit of tree growth is doubtless affected somewhat by the depth of the soil, by the steepness of slopes, by exposure to sun and wind and, in a few cases, by aridity, but these are all contributory agencies and temperature remains the primary cause." As, however, the prairie and plains regions are all within a zone of mean temperature higher than that required for tree growth, according to Professor Gannett, the explanation of their treeless condition must be found in the third cause—lack of sufficient moisture. Trees are moisture-loving, and the species which make up the rich forests of the United States do not form forests except under the encouragement of a certain amount of annual precipitation properly distributed. In regard to this point Professor Green says,² referring to Minnesota, which is divided between forest and prairie:

¹ *Journal of American Geographical Society*, vol. 31, p. 118.

² *Principles of American Forestry*, by Samuel B. Green, professor of horticulture and forestry, University of Minnesota.

Eastern Minnesota has a rainfall of perhaps twenty-six to thirty-five inches and a comparatively moist air, and at least during a part of the year is well adapted to the growth of the hardier kinds of trees. Here we find the white pine, basswood, oak, elm, poplar and other trees attaining large size. Western Dakota has a very light rainfall, mostly in the spring, and a very high rate of evaporation. Trees can scarcely be made to grow in this section without irrigation, and the low vegetation, the grasses, which require a less amount of water, replace the trees. It is evident that between locations having such extremes of tree growth there must be a place where the trees give way to the lower forms of vegetation. Such a meridional zone is found in central Minnesota, and, though it has probably changed with fluctuating rainfall, its general location has remained practically the same for many years. The location of this zone was probably gradually driven eastward, for many years previous to settlement, by the practice of the Indians of burning over prairies in order to furnish good pasturage for the buffalo. Of late years, since the prairie fires have been largely prevented, the treeline has moved westward and gained a little on the prairies. When left to itself, the western limit of this tree zone would not make very great progress westward, but with man's assistance in cultivation and various other ways, it may be extended much farther toward the arid regions than if left to natural conditions. So we find that, while great sections of the interior of this country are treeless on account of lack of water, trees planted on them and properly cared for may often grow thriftily.

The above excerpt recognizes the essential fact of moisture conditions as the ruling influence in forest growth and also the influence of change in climate and of human activity. In connection with this same subject William L. Bray,³ treating of the forest distribution of Texas in relation to rainfall, says:

The rainfall of Texas decreases progressively from east to west. A map constructed to indicate the annual precipitation by five-inch divisions would show a series of zones extending in a general north and south direction from the Sabine to the Pecos. Beyond the latter river the elevated mountain masses probably bring up the annual mean of rainfall, but at the westernmost boundary this average scarcely reaches ten inches. The limits of the several rainfall zones are approximately marked by the meridians of longitude. Thus, the ninety-fifth meridian about marks the western limit of rainfall exceeding fifty inches; the ninety-sixth, of forty-five inches; the ninety-seventh, of forty inches, and so on to the one hundred and second meridian, where the average annual rainfall has decreased to fifteen inches.

Corresponding in a general way with these zones of rainfall, there is a series of zones of forests of different types. In the eastern region, having a rainfall in excess of forty-five inches, are found the swamp and bayou forests of cypress, tupelo, water oak, swamp hickory and other water-loving species; in slightly better drained localities, the black gum, cottonwood, sycamore, beech, birch and Spanish oak, and after them red oak, white oaks, walnut, pecan, magnolia, holly and the

³ Forest Resources of Texas, United States Department of Agriculture, Bureau of Forestry, Bulletin No. 47.

like. After these, on higher lands, come the pines, loblolly on the sandy knolls and ridges of the Coast Plain, longleaf on the more rolling sand barrens of the Fayette Prairie and shortleaf on the higher uplands of the Lignitic Belt. The second forest zone consists of oak barrens, lying westward from the types of forest just mentioned, and in a rainfall zone of forty-five to thirty-five inches. Next is the central Texas hill zone, with a rainfall of from over thirty to less than twenty-five inches, where occur mountain cedar, mountain oaks (five or six species), cedar elm, gum elastic, Mexican persimmon and numerous others. Last of all come the pygmy forests of chaparral, embracing mesquite, retama, huisache, cat-claw, allthorn, palo-verde and a score besides.

Rainfall alone, however, does not determine the limits within which these species occur. There are canyons in the region where the annual rainfall is scarcely twenty inches in which may be found not only oaks, hickories and similar trees, but even the swamp-loving cypress. While the moisture demands of the different kinds of trees constitute the most potent of the causes which determine their distribution, it is not primarily the amount of moisture which falls to the ground, but the amount of moisture which the soil holds that affects them. The distribution through the zones of rainfall is consequently modified very considerably by the varying geological and soil conditions.

The geological structure alone may account for heavy timber in regions of low rainfall, simply by the supply of percolating waters which it may furnish.

And then, following a discussion of some of the minor influences affecting the tree distribution, Mr. Bray says: "It is rainfall rather than the nature of the soil and rock which has played the principal part in producing the main types into which the forests of the State naturally divide themselves."

Dr. J. W. Foster says:⁴ "Whenever we study the annual precipitation of moisture in connection with the laws of temperature, we find that wherever the moisture is equable and abundant we have the densely clothed forests; wherever it is unequally distributed we have the grassy plain and wherever it is mostly withheld we have the inhospitable desert. The varying supply of moisture, then, is sufficient to account for the diversity of vegetation, modified to some extent by the physical features of the country, altitude above the sea and the extremes of heat and cold."

He refers to a peculiar theory that the prairies are due to peat growth, and, after showing how little application that theory has to topography and actual conditions of the grassy plains of the United States, says, in reference to changes in arboreal development: "These changes are wholly independent of . . . isothermal lines but dependent on the variable supply of moisture."

⁴The Mississippi Valley; Its Physical Geography, by J. W. Foster, LL. D., Chicago and London, 1879.

He quotes Dr. J. G. Cooper, who remarks in regard to the botany of the Mississippi Valley that "No new forms of trees appear, while those found further eastward rapidly diminish toward the west. Thirteen species have not been traced west of its eastern border; about ninety extend pretty far into the Texan and Illinois regions; but only five or six cross the western limit of the Camanche and Dakotah regions, which, however, receive nine more from the west and south." The cause of the disappearance of trees he attributes to the insufficient and irregular supply of moisture. "It is true," he adds, "that this does not materially affect agriculture in the more eastern regions, in fact, most crops will succeed better with less rain than is necessary for most trees to thrive."

LIMITS OF THE EASTERN FOREST.

It is not to be supposed there is any sharp dividing line between the forest and the prairie; between the sections where trees are native and the treeless region. Some trees require less moisture than others, and these act as outposts and scouts for the slowly advancing forest, and the valleys, whose soil contains more moisture than that of the general level of the country, carry the tree growth hundreds of miles into the otherwise treeless area. The western limit of the Atlantic forest is, therefore, nowhere continuous. As the forest makes incursions upon the prairie, so the prairie makes important openings into what, as a general thing, is forested country. On this debatable ground, where the trees struggle for a foothold with varying degrees of success, cycles of climatic changes may be the reason for the establishment of outlying groups of trees, while fire has undoubtedly been responsible for keeping back the eastern forest limit and also for a good many inroads into the forest. Thus a hundred years ago there were some extended prairies in Kentucky, which, as soon as the fires were stopped, were soon reoccupied by the forest, so that lumbering operations within the last generation have been conducted on land which, when the Indians were expelled, was treeless.

Illinois is called a prairie state, but it was almost as much forest as prairie, and investigation leads to the conclusion that about forty-five percent of its area was, at the beginning of settlement, covered with valuable timber. Lumbermen are well aware that southern Illinois was once heavily forested, but most of them may not know that in the northern and western parts of the State there were some counties with 75 to 100 percent of their area covered with trees of commercial importance. So

in Iowa, about fourteen percent of the area was forest, but this timber, so far as it was of commercial value, was generally found in the eastern portion of the State in proximity to the Mississippi River.

The struggle of the trees for position on the prairies in the face of unfavorable moisture conditions is thus spoken of by Doctor Foster, quoted above:

The differences in the retentive power of moisture in the soil give to the eastern line of the prairie region an irregular outline, which may be likened to a deeply indented coast—far-entering bays, projecting headlands and an archipelago of islands.

What are known as "oak openings" indicate the transition from the densely wooded region to the treeless plains. The trees stand as in an artificial park, shading a green sward devoid of underbrush, so that the traveler may ride or drive in any direction. This characteristic feature I have noticed almost continuously from Green Bay to the western borders of Arkansas. The trees appear dwarfed and sickly. The extremities are often dead, while the main body is covered with foliage and the trunks when felled are found to be more or less decayed.

As stated in a previous chapter, the western boundary of the Atlantic forest runs approximately from northwestern Minnesota in a general southeasterly direction to Lake Michigan and into northwestern Indiana, thence in a southwesterly direction across Illinois and Missouri into Indian Territory, and thence more southerly to the Gulf of Mexico. It is frequently broadly stated that the entire country east of the Mississippi River was originally forested. This is true with the exception of the prairie districts of Wisconsin and Illinois, some small and relatively insignificant spaces in Indiana, southern Michigan and other states, and also some open territory along the sea and Gulf. But these open spaces were more than compensated for by the extension of the Atlantic forest west of the Mississippi River.

THE WOODED AREA.

The historian approaches with much hesitation the question of the area covered with forests either in the past or present. Some things are known with approximate accuracy. The facts as to the original area of the Atlantic forest are available with such accuracy as to make an estimation a very close approximation to the facts. But the West has been only partially examined, and enormous areas which are more or less wooded have not yet been carefully examined, although it is probable that more is known as to the amount of standing timber in Oregon, Washington and parts of Idaho and California than in regard to many of the timbered states of the older East. There is, further,

a lack of data for exact statement in regard to the present timbered area of the East within the confines of the Atlantic forest, owing to the rapidly changing bases of estimate. Some sections have been cut over a second and even a third time, so that areas whose timber supply was once supposed to have been exhausted, according to standards of estimate then prevailing, are again furnishing material for the sawmill. It is further impossible to determine with anything like accuracy what of the eastern areas not embraced in improved farm lands are desolate wastes of stump lands, or covered with brush, or are actually possessed of calculable quantities of commercial timber. Still, about all of the available data is in connection with such considerations and is further developed by the figures presented in census reports.

Before undertaking any minute consideration of the forests of the United States, it may be well to give an estimate for the entire country of the original and present wooded area, by states, omitting Alaska and other noncontiguous territory. This is presented in table A, on a following page.

From publications of the Government Land Office are derived the areas, in both square miles and acres, of each state and of the country as a whole. Then follows a careful estimate as to the original wooded area of the various states. In the case of most of the states east of the Mississippi River, it was assumed that they were covered, at the beginning of settlement, with practically solid forests. Exceptions of some importance, however, are Florida, which had a considerable treeless area; Illinois, which, according to a forest bureau estimate in 1884, was originally between 40 and 50 percent timbered; Indiana, which had some prairie and treeless swamp land, especially in its northwest portions, and some scrub lands in the south; Michigan, which had some prairies in the southern part of the State; Louisiana, with its grass prairies hardly lifted above tide-water on its south and especially its southwest coast, and Wisconsin with important areas of prairie or of the class called "oak openings." Moreover, all of the south Atlantic and gulf states have considerable areas lying along the coast practically devoid of trees.

The states west of the Mississippi River and south of the Rocky Mountains were some of them more difficult to estimate. Such states as Minnesota and Missouri were only partially timbered. The former had an extensive treeless area in the southwest and west, while the southern part of the State was the debatable ground between forest

and prairie. Missouri, while it was largely prairied in the north and west parts, was solidly timbered in the south, and had a great deal of timber elsewhere.

The estimates of these states were made by a consideration of their present condition as shown by government estimates, by observation and by conclusions drawn from their industrial and agricultural development. Such states as Kansas and Nebraska undoubtedly contain a much larger wooded area at present than at the beginning of their settlement, but the amount of woodland is relatively so insignificant that it did not seem worth while to attempt any adjustment, except in the case of Kansas, which had a small forest area in the southeast largely of deciduous woods. South Dakota has been increasing its wooded land by planting groves and windbreaks, but has lost by the cutting away to a large extent of the Black Hills timber. In a general way, the original wooded area of all the western and Rocky Mountain and Pacific Coast states was deduced from the reports of the Geological Survey as presented in the report of the census of 1900. This presentation was the work of Mr. Henry Gannett, geographer, who has made a special study of the forestal condition of the western part of the United States.

The conditions in the mountain states with respect to the amount of wooded land have changed very little since white settlement began. Lumbering has made some inroads upon the forest, while forest fires have swept over enormous areas; but in the main such areas must still be classed as woodlands, as they can be put to no other use, and under favorable circumstances their inevitable condition is a forested one.

A typical case is presented in Washington. Out of the State's total land area of 66,880 square miles, about 46,450 is estimated to be wooded. In this State, as to a less degree in other western states, there has been a heavy destruction of timber by fire, but no attempt has been made to estimate the extent of that destruction and to add the areas thus affected to the present area. Due to the fire destruction of the past, there should be a wider difference in the figures in the last two columns, but the endeavor more exactly to express that difference would involve an amount of research which would hardly be repaid by the result to be achieved, the important fact to be discovered being what the present wooded area is. Consequently the original area of the Pacific forest is given as substantially that of the forest of today.

The table, which represents the result of careful study and inquiry as to the original and present wooded areas of the country, is as follows:

TABLE A—ORIGINAL AND PRESENT WOODED AREA OF THE UNITED STATES.

STATES AND TERRITORIES.	Total land area.		Original wooded area.	Wooded area, 1905.		Percent of wooded to total area.
	Square miles.	Acres.		Square miles.	Acres.	
Alabama.....	51,028	32,657,920	50,000	37,000	23,680,000	72.5
Arizona.....	113,738	72,792,320	25,500	24,800	15,872,000	21.7
Arkansas.....	52,412	33,543,680	50,000	39,000	24,960,000	74.4
California.....	156,203	99,969,920	45,500	44,300	28,352,000	28.3
Colorado.....	103,669	66,348,160	34,000	32,900	21,056,000	31.7
Connecticut.....	4,794	3,068,160	4,800	1,900	1,216,000	39.6
Delaware.....	1,969	1,260,160	1,500	700	448,000	35.5
Florida.....	54,801	35,072,640	45,000	36,500	23,360,000	66.6
Georgia.....	58,850	37,664,000	57,000	41,000	26,240,000	69.6
Idaho.....	83,271	53,293,440	35,000	34,800	22,272,000	41.7
Illinois.....	56,004	35,842,560	25,000	10,000	6,400,000	17.8
Indiana.....	35,800	22,950,400	31,000	9,000	5,760,000	25.0
Indian Territory.....	30,804	19,714,560	22,000	20,000	12,800,000	64.9
Iowa.....	55,697	35,646,080	8,000	7,000	4,480,000	12.5
Kansas.....	81,848	52,382,720	7,000	5,700	3,648,000	6.9
Kentucky.....	39,898	25,534,720	38,000	18,000	11,520,000	45.1
Louisiana.....	45,399	29,055,360	40,000	28,000	17,920,000	61.6
Maine.....	29,804	19,132,160	29,000	23,000	14,720,000	76.9
Maryland.....	9,875	6,320,000	9,000	4,000	2,560,000	40.5
Massachusetts.....	8,038	5,144,320	8,000	4,200	2,688,000	52.2
Michigan.....	57,530	36,819,200	55,000	35,200	22,528,000	61.1
Minnesota.....	79,997	51,198,080	60,000	49,000	31,360,000	61.2
Mississippi.....	46,383	29,685,120	45,000	32,000	20,480,000	68.9
Missouri.....	68,431	43,795,840	50,000	30,000	19,200,000	43.8
Montana.....	146,240	93,593,600	42,500	41,500	26,560,000	28.3
Nebraska.....	76,777	49,137,280	2,500	2,500	1,472,000	2.9
Nevada.....	109,901	70,336,640	6,100	6,100	3,904,000	5.5
New Hampshire.....	9,056	5,795,840	9,000	5,000	3,200,000	55.2
New Jersey.....	7,454	4,770,560	7,000	3,200	2,048,000	42.8
New Mexico.....	122,545	78,428,800	22,700	23,500	15,040,000	19.1
New York.....	47,687	30,519,680	47,000	18,000	11,520,000	37.7
North Carolina.....	48,972	31,342,080	47,000	34,000	21,760,000	69.4
North Dakota.....	70,172	44,910,080	1,000	1,000	384,000	0.8
Ohio.....	40,723	26,062,720	40,000	9,000	5,760,000	22.1
Oklahoma.....	38,623	24,718,720	4,400	4,000	2,560,000	10.3
Oregon.....	95,746	61,277,440	55,000	53,900	34,496,000	56.3
Pennsylvania.....	44,679	28,594,560	44,000	21,000	13,440,000	47.0
Rhode Island.....	1,081	691,840	1,000	400	256,000	37.0
South Carolina.....	30,460	19,494,400	28,000	19,500	12,480,000	64.0
South Dakota.....	76,885	49,206,400	3,000	2,500	1,600,000	3.2
Tennessee.....	41,886	26,679,040	40,000	25,000	16,000,000	59.9
Texas.....	262,506	168,300,840	75,000	62,500	40,000,000	23.8
Utah.....	82,096	52,541,440	10,000	10,000	6,400,000	12.1
Vermont.....	9,114	5,832,960	9,000	3,500	2,240,000	38.4
Virginia.....	39,925	25,552,000	39,000	23,400	14,976,000	58.7
Washington.....	66,792	42,746,880	48,000	46,450	29,728,000	69.3
West Virginia.....	24,343	15,579,520	24,000	15,500	9,920,000	63.7
Wisconsin.....	55,117	35,274,880	47,000	28,500	18,240,000	51.7
Wyoming.....	97,552	62,433,280	12,500	12,500	8,000,000	12.8
Total—United States....	2,972,525	1,902,416,000	1,440,000	1,040,450	665,504,000	35.0

The total land area of the United States, not including noncontiguous territory or the District of Columbia, is 2,972,525 square miles, of which the above estimate claims an original wooded area of 1,440,000 square miles, or 48½ percent, whereas the present woodland area,

according to this estimate, is only 1,040,450 square miles, or less than 35 percent of the entire land area. The drain upon this timber has been going on in every section since its first occupancy by white men. The first settlers in Virginia, Pennsylvania, New York and Massachusetts at once began to cut timber for shelter and fuel, and this usage of the forests has continued ever since with new and increasingly diversified uses, expanding not only with the increase of population, but with a still greater growth due to the demands of a rapidly developing civilization, until the equivalent of approximately 40,000,000,000 feet of timber was manufactured in the United States during 1899, which was the year covered by the census of the following year.

It will be noted that the expression "wooded area" is used instead of "forest area" for the reason that the dividing line between wooded and forested lands is impossible of exact definition. It is not assumed that all of this land estimated as wooded was, or is, entirely covered with commercial timber. There are in it stumpage lands, farmers' wood lots, a certain percentage of brush lands and burned-over lands, bearing little or no commercial timber. The estimate is, therefore, an approximation of the area covered in 1905 by commercial forests and that which is potential forest land—that is to say, land which has been wholly or in part denuded, but which is not available for agricultural uses, and is, therefore, likely to revert to a forested condition.

The estimate as to wooded areas of the United States, contained in the report of the twelfth census referred to above, was in square miles, by states and territories, and given in the running comment as to the forested condition of the states, varieties of commercial woods in them, etc., but was not tabulated. Mr. Gannett also named the percentage which these estimated forest areas bore to the entire area of the states. It will be noted that these percentages are in reverse ratio to the quantity of arable land in the respective states where those states were originally forest covered. Thus, in rugged Pennsylvania more than half the area is wooded, while the comparatively young but fertile state of Indiana retains only 30 percent under forest or brushlands. Ohio's proportion of wooded land is still smaller. As the country becomes more densely populated the farm area will increase, but it will be many years before any important inroad will be made upon the wooded area of most of the states east of the Mississippi River. These estimates have been tabulated for the purpose of this work, reducing square miles to acres, and are presented as follows:

LUMBER INDUSTRY OF AMERICA.

TABLE B—WOODED AREA OF THE UNITED STATES—FROM THE TWELFTH CENSUS.

STATES AND TERRITORIES.	Square miles.	Acres.	Per- cent of total area.	STATES AND TERRITORIES.	Square miles.	Acres.	Per- cent of total area.
Alabama.....	38,300	24,512,000	74	Nevada.....	6,100	3,904,000	6
Arizona.....	25,000	16,000,000	22	New Hampshire.....	5,200	3,328,000	58
Arkansas.....	45,000	28,800,000	84	New Jersey.....	3,234	2,069,760	43
California.....	44,700	28,608,000	22	New Mexico.....	23,700	15,168,000	19
Colorado.....	33,500	21,440,000	32	New York.....	18,700	11,968,000	29
Connecticut.....	1,900	1,216,000	39	North Carolina.....	35,800	22,592,000	73
Delaware.....	700	448,000	36	North Dakota.....	600	384,000	1
Florida.....	37,700	24,128,000	70	Ohio.....	9,800	5,952,000	23
Georgia.....	42,000	26,880,000	71	Oklahoma.....	4,400	2,816,000	11
Idaho.....	35,000	22,400,000	42	Oregon.....	54,300	34,752,000	57
Illinois.....	10,200	6,528,000	18	Pennsylvania.....	28,000	14,720,000	51
Indiana.....	10,800	6,912,000	30	Rhode Island.....	400	256,000	40
Indian Territory.....	20,000	12,800,000	65	South Carolina.....	20,500	13,120,000	63
Iowa.....	7,000	4,480,000	13	South Dakota.....	2,500	1,600,000	3
Kansas.....	5,700	3,648,000	7	Tennessee.....	27,300	17,472,000	35
Kentucky.....	22,200	14,208,000	53	Texas.....	64,000	40,960,000	24
Louisiana.....	28,300	18,112,000	62	Utah.....	10,000	6,400,000	13
Maine.....	23,700	15,168,000	79	Vermont.....	3,900	2,496,000	43
Maryland.....	4,400	2,816,000	44	Virginia.....	25,400	14,976,000	55
Massachusetts.....	4,200	2,688,000	52	Washington.....	47,700	30,528,000	71
Michigan.....	38,000	24,320,000	67	West Virginia.....	18,400	11,776,000	73
Minnesota.....	52,200	33,408,000	66	Wisconsin.....	51,750	30,320,000	53
Mississippi.....	32,900	20,672,000	70	Wyoming.....	12,500	8,000,000	12
Missouri.....	41,000	26,240,000	60	Total—U. S....	1,094,284	700,341,760	36
Montana.....	42,000	26,880,000	29				
Nebraska.....	2,300	1,472,000	3				

In connection with the above estimates Mr. Gannett briefly describes the forest condition of the various states both as to area covered and kinds of timber. From his remarks have been selected the following, which relate to the particular subject in question—original and present wooded areas :

TIMBER CONDITIONS OF THE STATES.

Alabama—The northern part of the State, including nearly three-fourths of it, is covered with a timber growth of which hardwoods form the principal component. . . . The southern fourth of the State is covered with a nearly pure growth of yellow pine, mainly of the longleaf species. In the marshes around Mobile Bay, however, this gives way to cypress.

Arizona—The merchantable timber of Arizona is confined almost entirely to the summit and borders of the Colorado plateau.

Arkansas—The area of Arkansas is almost entirely covered with forests, the only exception being a few prairies in the eastern part of the State.

California—The timber of California is found upon the Sierra Nevada and the coast ranges north of San Francisco Bay. A little is found in the coast ranges farther south and in those of southern California.

Colorado—The timber of Colorado is found only in the mountainous portions of the State, the plains in the east and the plateaus in the west being almost entirely destitute of tree growth.

Connecticut—Originally covered with forests.

Delaware—Originally covered with forests.

Florida—The northern part of Florida, including half of the peninsula, is a forested region, covered in the main with yellow pine, with a large amount of cypress in the marshy regions, especially along the coasts. The forest is not continuous, but is much broken by prairie openings.

Georgia—The northern mountainous portion of the State and the Piedmont region, extending southwestward to the Fall Line, which passes through Augusta, Macon and Columbus, are covered with mixed forests, mainly of hardwood; and the region below the Fall Line comprises the yellow pine belt, which is succeeded in the lower regions immediately bordering the coast by cypress.

Idaho—The northern part of Idaho is well timbered, the amount and density of the forest diminishing southward, so that in the Salmon River Mountains there is not much timber, while the great lava plateau occupying the southern part of the State is entirely devoid of anything larger than sagebrush.

Illinois—Mainly prairie with forests in the southern part only.

Indiana—This State, with the exception of a small proportion of prairie, was originally covered with forest.

Indian Territory—Pine is found in Indian Territory in the eastern part only, and, with the exception of a small area in the Boston Mountains, only in the southeastern part south of the Arkansas River. Elsewhere the timber of the territory consists of hardwoods, mainly of black-jack and post oak upon the uplands, with larger and more valuable species in the bottom lands.

Iowa—Iowa is a prairie state without merchantable forests. Such as formerly existed have been practically cut away.

Kansas—There are no forests in Kansas. Hardwood is found in the southeastern part of the State, and there only to a small extent.

Louisiana—The southern portion and especially the southwestern part of the State, the parishes of Cameron, Vermilion, and Calcasieu, are largely prairie. Elsewhere the State is densely forested.

Maine—Originally a forest clad State throughout.

Maryland—Originally the northwest portion of the State, which lies within the Appalachian Mountain region, was covered with mixed forests of white pine, hemlock and hardwood. The central portion, stretching from the Blue Ridge to Chesapeake Bay, was covered with forests of hardwoods, while the eastern shore contained pine forests with some hardwoods.

Massachusetts—Originally covered with forests.

Michigan—The Upper Peninsula and the northern half of the Lower Peninsula were originally covered with heavy forests of conifers, consisting mainly of white pine. Southward, in the Lower Peninsula, hardwoods were intermingled in increasing proportion, while the southern part was largely prairie.

Minnesota—Heavily timbered, mainly with white pine in the northern portion, while the Red River Valley on the west and the southern portion were largely prairie, with a belt of mixed hardwood forests intervening.

Mississippi—Originally nearly all covered with timber.

Missouri—The northern part of Missouri is, like Iowa, a prairie region, with timber in the valleys of the principal streams and in occasional patches on the uplands. The southern portion is, except where cleared for farming, quite continuously wooded.

Montana—The forests of Montana are limited to the western half of the State, and in that region almost entirely to the mountains, the valleys being, as a rule, timberless.

Nebraska—Woodlands are found only in the eastern part closely bordering the Missouri River and in narrow strips extending up the streams.

Nevada—There is but little timber in Nevada, that little being mainly found in the western part of the State in the regions outlying the Sierra Nevadas.

New Hampshire—Was originally covered with forests.

New Jersey—The northern part of New Jersey was originally covered with a mixed forest, composed mainly of hardwoods, while the southern part was a continuous forest of yellow pine, with some cypress in the lowlands bordering the coast.

New Mexico—Merchantable timber in this territory is confined to the mountains.

New York—Originally covered with forests.

North Carolina—The mountain regions of this State were originally covered with dense forests of mixed conifers and hardwoods, the Piedmont region mainly with oak forests and the Atlantic plain with open forests of yellow pine, while the swampy regions near the coast contain large quantities of cypress.

North Dakota—In this State woodlands are found only on the Turtle Mountains and perhaps a few other glacial hills and in narrow strips along the Missouri and other streams.

Ohio—When settlement commenced in this State it was in the main covered with heavy forests of hardwoods, through which was scattered a small admixture of white pine.

Oregon—The forests of Oregon are found mainly west of the crest of the Cascade Range. . . . East of the range the timber is by no means as heavy and is confined to the eastern slopes of the range, the higher parts of the plateau and the Blue Mountains in the northeastern part of the State.

Pennsylvania—The State was originally forest clad.

Rhode Island—Originally a forest clad State.

South Carolina—The upland portion of this State, from the Blue Ridge down to the Fall Line, was originally covered with hardwood forests, in which was interspersed some pine. Below the Fall Line stretches the yellow pine belt, while in the lowlands along the coast is some cypress.

South Dakota—In the eastern part of this State timber is found only in the valley of the Missouri and perhaps one or two other streams. In the western part of the State are the Black Hills, which are covered with a pure forest of yellow pine.

Texas—With the exception of the northeastern portion, this great State is almost treeless.

Utah—Merchantable timber in Utah is found mainly in the Uinta Mountains in the northeastern part of the State and upon the high plateaus in the southern part.

Vermont—Was originally forested throughout.

Virginia—May be divided into three areas: The mountain section, formerly forested with pine, hemlock, and hardwoods; the Piedmont region, largely with oaks, mingled with some pine, and the Tertiary lands below the Fall Line, formerly covered with yellow pine.

Washington—Forests east of the mountains are light as compared with those west of the range. In that portion of the State the forests, consisting mainly of red fir, are very heavy.

West Virginia—Lies on the Alleghany plateau. . . . The higher parts of this plateau are timbered with white pine, hemlock and hardwoods, while lower down the slope the proportion of hardwoods increases, and the lower slopes were originally covered with forests of these species.

Wyoming—The timber of this State is confined mainly to the Yellowstone Park with the mountains east and south thereof, the Big Horn Mountains in the north and the Medicine Bow Mountains in the southeast.

In a few instances some slight exceptions may be taken to the statements given above. The assertion that the southern part of the lower peninsula of Michigan was largely prairie, seems exaggerated. There were prairies of considerable extent in that portion of the State, but they constituted no large percentage of even the southern half of that peninsula. Mr. Gannett says that much of the southern part of the peninsula has been "cleared for cultivation," which would hardly have been necessary if it had been largely prairie.

In regard to Illinois, it may be stated that there were "woods" in the western and northwestern parts of the State of sufficient extent to be called forests. It is authoritatively stated that some counties adjoining the Mississippi River north of the southern forest belt were almost wholly covered with commercial timber, while other counties had from 50 to 75 percent of good timber.

In regard to Kansas the statements may be technically correct, but the southeastern portion of the State had sufficient timber to maintain something of a lumber industry even to this day.

The statement in regard to Iowa is at present correct, but, as shown in table A, about fourteen percent of the State, almost entirely in the eastern portion, bore timber which was of commercial value. In 1900 over 200 sawmills were cutting native timber.

IMPROVED AND UNIMPROVED LANDS.

It will be observed that areas given in table B are somewhat modified in table A. This is due partly to the passage of time during which the lumbermen and fires have been at work, and partly to the correction of some evident errors. One of the important checks on any such estimate is the census report on farm acreage. This report is worthy of much credence. Under the census report the total farm acreage by states was given, together with the acreage in improved and unimproved lands, which made up the total of farm acreage. The

total area of the farms in the United States was 841,201,546 acres, of which 414,793,191 was improved and 426,408,355 unimproved. This left 1,061,214,454 acres not included in farms. In this area are forest lands proper, prairies, treeless plains, deserts, government lands and city and village land. Adding together the area not in farms and the area of unimproved farm lands, the sum is 1,487,622,809 acres, out of the total land surface of the United States of 1,902,416,000 acres. This total of land not improved, therefore, is the extreme limit of possibilities as to wooded lands.

In the West this area includes, of course, the prairie lands, the grassy plains, the arid regions and that small area that is lifted above the tree-line. In the West, therefore, the proportion of unutilized land that is now and always will be treeless is large. In view of the fact that the available water supply, if it could all be used for irrigation, would then render fertile only the minority of the area west of the one hundredth meridian, it is evident that never—in the human use of that word—will all the area be either improved or under forests. A large percentage of that territory must always remain practically a waste.

In the East, on the other hand, while the area not improved contains extensive tracts of what are at the present time stump lands, a certain percentage of swamp lands, barrens and tide lands and a considerable acreage within the limits of cities, towns and villages, the time will come when nearly all the area east of the Mississippi River will fall into one of two classes—improved lands and forest lands. For, with the swamps drained, as they will be, all the land not needed for agriculture or for residence and business purposes will be devoted to forest growth. In that section stump land not adapted to agriculture will be re-covered with forests, and the barrens will be made productive in the same way. The time will come when the difference between the total area and the area of improved farm lands plus the land used for residential, industrial and commercial purposes will almost exactly represent the forest area.

This presentation of total land surface, of the acreage of improved and unimproved farm lands, of the area not included in farms, and of the total not improved, as derived from the census of 1900, is as follows:

TABLE C—IMPROVED AND UNIMPROVED LANDS—FROM THE TWELFTH CENSUS.

STATES AND TERRITORIES.	Total land surface, acres.	Number of acres in farms.			Total not in farms.	Total not improved.
		Total.	Improved.	Unimproved.		
Alabama.....	32,657,920	20,685,427	8,654,991	12,030,436	11,972,493	24,002,929
Arizona.....	72,792,320	1,935,327	254,521	1,680,806	70,856,993	72,537,799
Arkansas.....	33,543,680	16,636,719	6,953,735	9,682,984	16,906,961	26,589,945
California.....	99,969,920	28,828,951	11,958,637	16,870,114	71,140,969	88,011,083
Colorado.....	66,348,160	8,474,588	2,273,968	7,200,620	56,873,572	64,074,192
Connecticut.....	3,068,160	2,312,083	1,064,525	1,247,558	756,077	2,003,635
Delaware.....	1,260,160	1,066,228	754,010	312,218	193,932	506,150
Florida.....	35,072,640	4,363,891	1,511,653	2,852,238	30,708,749	33,560,987
Georgia.....	37,664,000	26,392,057	10,615,644	15,776,413	11,271,943	27,048,356
Idaho.....	53,293,440	3,204,903	1,413,118	1,791,785	50,088,537	51,880,322
Illinois.....	35,842,560	32,794,728	27,699,219	5,095,509	3,047,832	8,143,341
Indiana.....	22,950,400	21,619,623	16,680,358	4,939,265	1,330,777	6,270,042
Indian Ter.....	19,714,560	7,269,081	3,062,193	4,206,888	12,445,479	16,652,367
Iowa.....	35,646,080	34,574,337	29,897,552	4,676,785	1,071,743	6,748,528
Kansas.....	52,382,720	41,662,970	25,040,550	16,622,420	10,719,750	27,342,170
Kentucky.....	25,534,720	21,979,422	13,741,968	8,237,454	3,555,298	11,792,752
Louisiana.....	29,055,360	11,059,127	4,666,532	6,392,595	17,996,233	24,388,828
Maine.....	19,132,160	6,299,946	2,386,869	3,913,077	12,832,214	16,745,271
Maryland.....	6,320,000	5,170,075	3,516,352	1,653,723	1,149,925	2,803,648
Mass.....	5,144,320	3,147,064	1,292,132	1,854,932	1,987,256	3,852,188
Michigan.....	36,819,200	17,561,698	11,799,250	5,762,448	19,257,502	25,019,950
Minnesota.....	51,198,080	26,248,498	18,442,585	7,805,913	24,949,582	32,755,495
Mississippi.....	29,685,120	18,240,736	7,594,428	10,646,308	11,444,384	22,090,692
Missouri.....	43,795,840	33,997,873	22,900,043	11,097,830	9,797,967	20,895,797
Montana.....	93,593,600	11,844,454	1,736,701	10,107,753	81,749,146	91,856,599
Nebraska.....	49,137,280	29,911,779	18,432,593	11,479,184	19,225,501	30,704,685
Nevada.....	70,336,640	2,565,647	572,946	1,992,701	67,770,993	69,763,694
New Hamp.....	5,795,840	3,609,864	1,076,879	2,532,985	2,185,976	4,718,961
New Jersey.....	4,770,560	2,840,966	1,977,042	863,924	1,929,594	2,793,518
New Mexico.....	78,428,800	5,130,878	326,873	4,804,005	73,297,922	75,101,927
New York.....	30,519,680	22,648,109	15,599,986	7,048,123	7,871,571	14,919,694
N. Carolina.....	31,342,080	22,749,356	8,327,106	14,422,250	8,592,724	23,014,974
N. Dakota.....	44,910,080	15,542,640	9,644,520	5,898,120	29,367,440	35,265,560
Ohio.....	26,062,720	24,501,985	19,244,472	5,257,513	1,560,735	6,818,248
Oklahoma.....	24,718,720	15,719,258	5,511,994	10,207,264	8,999,462	19,206,726
Oregon.....	61,277,440	10,071,328	3,328,308	6,743,020	51,206,112	57,949,132
Pennsylvania.....	28,594,560	19,371,015	13,209,183	6,161,832	9,223,545	15,385,377
Rhode Island.....	691,840	455,602	187,354	268,248	236,238	504,486
S. Carolina.....	19,494,400	13,985,014	5,775,741	8,209,273	5,509,386	13,718,659
S. Dakota.....	49,206,400	19,070,616	11,285,983	7,784,633	30,135,784	37,920,417
Tennessee.....	26,679,040	20,342,058	10,245,950	10,096,108	6,336,982	16,433,090
Texas.....	168,003,840	125,807,017	19,576,076	106,230,941	42,196,823	148,427,764
Utah.....	52,541,440	4,116,951	1,032,117	3,084,834	48,424,489	51,509,323
Vermont.....	5,832,960	4,724,440	2,126,824	2,597,616	1,108,520	3,706,336
Virginia.....	25,552,000	19,907,883	10,094,805	9,813,078	5,644,117	15,457,195
Washington.....	42,746,880	8,499,297	3,465,960	5,033,337	34,247,583	39,280,920
W. Virginia.....	15,579,520	10,654,513	5,498,981	5,155,532	4,925,007	10,080,539
Wisconsin.....	35,274,880	19,882,727	11,246,972	8,615,755	15,412,153	24,027,908
Wyoming.....	62,433,280	8,124,536	792,332	7,332,204	54,308,744	61,640,948
Total—U. S.	1,902,416,000	841,201,546	414,793,191	426,408,355	1,061,214,454	1,487,622,809

The estimate made by Mr. Gannett in some cases, it will be found, gives a wooded area in a state greater than the total area not improved as derived from the census of farm areas. It has thus been possible to cut down the estimate of the probable area of woodland of the various states into the areas as expressed in table A.

Thus, in the eastern forest, including west of the Mississippi River only Missouri, Indian Territory, Arkansas and Louisiana, we find the total wooded area, or actual and potential forest land, to be 624,500

square miles, as against Mr. Gannett's estimate in 1900 of 673,280 square miles. Without doubt, some such area as this may be considered practically the permanent area of the eastern forest, which, under proper management, will go far toward supplying the timber needs of the eastern half of the country for an indefinite period. This area is the equivalent of 399,680,000 acres.

If it be assumed—and it must be remembered that these statements are largely assumption only—that this wooded area contains an average of 3,000 feet of commercial timber to the acre, the amount of timber standing upon it would be 1,199,040,000,000 feet. Therefore, if the Atlantic forest were called upon to furnish 40,000,000,000 feet board measure of material annually, the supply would last thirty years. But it may safely be estimated that the Pacific forest is capable of supplying in perpetuity at least 15,000,000,000 feet annually, leaving 20,000,000,000 feet to be supplied by the Atlantic forest. This would mean a crop rotation of sixty years, which, under proper methods of management, it is agreed by professors of forestry, could be easily achieved. The eastern and western forests, which have approximately equal amounts of standing timber, could, between them, easily supply a demand a little more than equal to that of the present.

UNDERESTIMATES OF STANDING TIMBER.

All past estimates as to the amount of standing timber in the United States have been grossly inaccurate. Without exception they have been far too low, as has been demonstrated by experience. Several causes have been responsible for these erroneous estimates. One was a lack of inclusiveness. In the lumbering states timber has been largely in the hands of heavy operating holders. These holdings could be estimated with something like accuracy and seldom were forgotten or overlooked in the computation; but, in addition, there were a multitude of small holdings, from the farmer's wood lot of twenty or forty acres up to tracts of a few thousand acres. In the long run all of these contribute to the supply of saw timber, and in many states, especially the older ones, these small holdings have served to prolong the life of the industry far beyond any former estimates. Furthermore, these small tracts have contributed no small amount of timber through forest growth.

Another reason for mistaken estimates has probably been the disposition of timber holders to understate either the actual acreage or the stumpage belonging to them. In such underestimates they might be

influenced by competitive considerations or by the desire to avoid heavy taxation, which has been one of the most serious obstacles with which the industry has had to contend. Still another, and perhaps the most usual, cause of underestimates has been the varying bases of calculation at various times. The estimate of standing timber has been based upon the logging custom of the time. When it was the practice to cut large timber only, as in Michigan for example, when sixteen-foot logs were of such a size that it required but two to five to make a thousand feet board measure, when only the best trees were cut and only the best logs from the trees were taken to the mill, leaving perhaps two or three times as much timber in cubic contents in the woods as was presented to the saw, the estimate as to the quantity of timber standing, and consequently the duration of the business, was very much lower than in later times when logs as small as six or eight inches in diameter were marketable. Illustrating this point, within the last decade government estimators who have been at work upon the problem of the timber supplies of the Pacific Coast have had occasion to revise their calculations and largely to increase the estimate of the standing timber in these states because of current changes in methods of logging. While errors of estimate arising from this cause were natural, it would seem that experience should have taught the later estimators the unwisdom of basing their predictions as to the future life of the industry upon current standards. The facts in these matters have always discomfited the theorists. Lumbermen have again and again pronounced the supplies of given districts exhausted—as, in fact, they were from their standpoint—only to have their successors cut several times as much lumber as was taken by the pioneers.

The Atlantic Coast states, together with New York and Pennsylvania, have long passed the period when the lumber industry should, according to the prognostications of early estimators, have been entirely exhausted, and still they remain lumber producers of importance. Growth and reafforestation—the latter, so far, by natural processes only—have prolonged the life of the industry, while the utilization of woods once neglected has contributed its share toward the maintenance of the industry.

Perhaps the most remarkable example of mistaken estimate has been regarding the pine forests of Michigan, Wisconsin and Minnesota. The first attempt at a census of the timber of these states was made in connection with the census of 1880. The estimate for Michigan at

that date was 35,000,000,000 feet; for Wisconsin, 41,000,000,000 feet, and for Minnesota, 8,170,000,000 feet. The estimate for Michigan, which was the best known as it was the earliest developed portion of that magnificent timbered section, was not very far from correct, but Wisconsin since that time has produced over 60,000,000,000 feet, and will support a steadily decreasing output for a good many years to come. Minnesota, which in 1880 was the least known, was most egregiously underestimated. Whereas the standing pine in that State was estimated in 1880 at 8,170,000,000 feet, in 1895 one of the most thorough students of its forestal condition estimated the pine supply as over 17,000,000,000 feet, notwithstanding the product of the State had, during all that period between 1880 and 1895, been steadily increasing, with a total production during that time at least double the amount of the 1880 estimate. And yet in 1905 the fire warden of Minnesota informally estimated the pine timber supply of the State at about 25,000,000,000 feet. Another estimate is 40,000,000,000 feet.

It should be stated, however, in connection with these figures, that the earlier estimates covered only white pine, while the later ones include red pine with the white, inasmuch as they grow together, are logged together and are marketed together.

The history of the development of lumbering districts shows, first, an overestimate of the supply, because of which this great natural resource was wastefully used and disposed of at prices lower than would have been warranted by the actual conditions; and, second, in a startled revulsion of sentiment, the underestimates noted above, which resulted in prices for standing timber, particularly in the white pine states, higher for the time than were justified by the facts since developed. The result was that timber values were too low for a long period and then experienced a sudden and enormous advance, to be succeeded in turn by a long period of level values, whereas the logical effect of actual knowledge would have been a slow but steady advance from year to year, and from decade to decade.

The history of white pine is being repeated in other woods. The supply of southern pine was, for many years, overestimated in respect to its relation to the demand. It was thought that a market could never be found for the possible output of this class of material. In 1880 the tenth census estimate of the stand of southern yellow pine of the four principal species was 237,000,000,000 feet. The product has already reached 10,000,000,000 feet annually, and a conservative esti-

mate in 1905—an estimate which is almost assuredly under rather than over the fact—is of 300,000,000,000 feet.

In regard to this matter Mr. Gannett, in his report on the lumber business in connection with the twelfth census, says: "The area occupied by pure pine forests in the states above enumerated [the Carolinas, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas and Arkansas] is approximately 150,000 square miles, or about 100,000,000 acres. The average stand of timber on this area, from the past information on timber, is not far from 3,000 feet board measure per acre, giving a total stand on this area of 300,000,000,000 feet." If that estimate of 1900 were correct as to the acreage of pure pine forest, the amount of pine standing in isolated tracts would have largely increased the total of stumpage.

Estimates as to the immense hardwood resources of the eastern forest have always been inadequate, chiefly owing to omission of many species once neglected but now readily marketable, and to neglect of the factor of growth. This factor of reafforestation has been, and will be for many years to come, of more importance in connection with the hardwoods than with the pine. The pine forest reproduces itself but slowly, if at all, and, further, the pines are in many cases succeeded by broad-leaved trees. In the hardwood belt, however, reproduction is certain, and as rapid as the rate of growth of the various species will permit. The extension of estimates to include varieties of wood once neglected, is of importance. A quarter of a century ago oak, walnut, ash, hickory, poplar, birch, cherry, maple and basswood were practically the only hardwoods of market value that were considered in the estimate of any hardwood tract. Now gum, cottonwood, beech, sycamore and others occupy prominent places, in fact, almost every species of broad-leaved trees which matures to a trunk diameter of twelve or fifteen inches is of utility and market value.

The same process has been going on in the West. A quarter of a century ago redwood was practically the only tree species of the western forest that was recognized in the East, the only other western species that was manufactured on any important scale being Douglas spruce, or Oregon pine (*Pseudotsuga taxifolia*), which found a coast-wise market in the United States and was to some extent exported. Now dozens of species are known and utilized, among the most important being yellow pine, sugar pine, mountain pine, hemlock, cedar of two or three species, spruce, fir of several species and a number of hardwoods. There, also, the forests were considered inexhaustible.

The influences which have resulted in too low estimates in the past are still at work, although the field upon which they may act has been narrowed. If, therefore, the estimate of wooded area in 1905 of 1,040,450 square miles for the entire country, shown in table A, is approximately correct, there is a basis for an estimate higher than any of those ordinarily made as to the amount of standing timber upon it. Recognizing the fact that some of this area has been cut over and burned over, and that some of it is brush lands, it is not improbable that 3,000 feet per acre may yet, on the average, be cut from it, due to closer methods of manufacture in many species, to the inclusion of species now neglected and to the growth of timber on tracts culled over or completely cut. If such an estimate be given, it means 2,000,000,000,000 feet of standing timber, which, at a consumption of 40,000,000,000 feet annually, would supply the demands of the country for fifty years.

The author does not wish to be understood as speaking dogmatically, nor as basing his reputation on such an estimate; but in view of the history of timber estimates, in view of the rapid changes of the basis of estimation, and considering the very heavy amount of stumpage on much of the yet virgin timber land, it seems not improbable that such an estimation will be realized and perhaps surpassed.

But, whatever may be the outcome, it seems plain that the United States has no more timber than it needs as a capital from which to draw as interest its annual requirements, and that economy and conservation should and must be the policy of the future.

This question of the total timber supply of the United States has long been a disputed one, and while of recent years all schools have admitted that the supplies are none too great for future needs and are deserving of conservation, there has been more or less acrimonious controversy as to the precise facts. One of the most able writers on this general subject is Bernhard E. Fernow, LL. D., who was for a considerable period at the head of the Forestry Department of the National government and who has been a careful student along this line of research. In 1902 Doctor Fernow took issue with Mr. Gannett in regard to the amount of timber remaining in the United States, or rather, to the area which then bore merchantable timber or was capable of producing such within a generation.

He said,⁵ as an introduction to the table which is reproduced here-

⁵ *Economics of Forestry*, by B. E. Fernow, LL. D., December, 1902.

with, which, it will be noted, is along the line of table C, showing total land surface, farm land, unimproved lands, etc.: "The subjoined table gives an estimate of the areas which either bear valuable forests or are capable of producing such without effort of man in our generation. This table is based upon a similar table by the writer in 1893, upon the basis of the area reported by the twelfth census. The geographical arrangement and subadditions have been made with a view of bringing out the relative commercial and economic value of the forest areas."

TABLE D—DR. FERNOW'S ESTIMATE OF FOREST AREAS.

STATES AND GROUPS.	Area.		Percent.		
	Total land surface, thousand acres.	Improved land in farms, thousand acres.	Improved land.	Brush, forest and waste land.	Probably forest.
United States.....	1,900,800	414,793	22	78	26
Maine.....	19,132	2,386	12	88	64
New Hampshire.....	5,783	1,076	19	81	62
Vermont.....	5,846	2,126	36	64	42
Massachusetts.....	5,155	1,292	25	75	29
Rhode Island.....	664	187	27	73	40
Connecticut.....	3,100	1,064	34	66	29
New England States.....	39,710	8,131	20	80	52
New York.....	30,376	15,599	51	49	30
Pennsylvania.....	28,790	13,209	46	54	24
New Jersey.....	4,671	1,977	42	58	41
Delaware.....	1,254	754	60	40	24
Maryland.....	6,810	3,516	56	44	32
Middle Atlantic States.....	71,401	35,055	49	51	28
Virginia.....	25,680	10,094	39	61	48
North Carolina.....	31,089	8,327	27	73	54
South Carolina.....	19,808	5,776	30	70	45
Georgia.....	38,647	10,615	27	73	50
Southern Atlantic States.....	114,724	34,811	30	70	49
Atlantic Coast.....	225,835	77,997	35	65	43
Florida.....	34,713	1,511	4	96	58
Alabama.....	32,986	8,654	26	74	53
Mississippi.....	29,858	7,594	26	74	44
Louisiana.....	29,069	4,666	16	84	45
Gulf States.....	126,426	22,425	18	82	50
Texas.....	167,806	19,576	12	88	23
Michigan.....	36,755	11,799	32	68	50
Wisconsin.....	34,848	11,246	32	68	47
Minnesota.....	50,681	18,442	36	64	36
Northern Lumbering States.....	122,294	41,487	34	66	43

TABLE D—Continued.

STATES AND GROUPS.	Area.		Percent.		
	Total land surface, thousand acres.	Improved land in farms, thousand acres.	Improved land.	Brush, forest and waste land.	Probably forest.
Ohio	26,086	19,244	74	26	16
Indiana.....	22,982	16,690	73	27	15
Illinois.....	35,840	27,699	77	23	10
Northern Agricultural States.....	84,008	63,623	75	25	13
Lake States.....	207,202	105,110	51	49	31
West Virginia.....	15,772	5,498	35	65	52
Kentucky.....	25,600	13,741	54	46	43
Tennessee.....	26,720	10,245	38	62	55
Arkansas.....	33,949	6,953	21	79	60
Missouri.....	43,990	22,900	52	48	36
Central States.....	146,031	59,337	41	59	49
Iowa.....	35,504	29,897	84	16	13
North Dakota.....	45,308	9,644	21	79	1
South Dakota.....	49,696	11,285	23	77	2
Nebraska.....	42,998	18,432	43	57	3
Kansas.....	52,288	25,040	48	52	7
Oklahoma.....	24,960	5,511	22	78	...
Prairie States.....	250,754	99,809	40	60	4
Interior States.....	396,785	159,146	40	60	20
Montana.....	92,998	1,736	2	98	18
Wyoming.....	62,448	792	1	99	12
Colorado.....	66,332	2,273	3	97	16
New Mexico.....	78,374	326	0.4	99.6	6
Eastern Rocky Mountain Region.....	300,154	5,127	2	98	13
Idaho.....	53,945	1,413	3	97	20
Nevada.....	70,233	572	0.8	99.2	...
Utah.....	52,601	1,032	2	98	16
Arizona.....	72,268	254	0.3	99.7	14
Western Rocky Mountain Region.....	249,047	3,271	1.3	98.7	8
Rocky Mountain Region	549,201	8,398	1.5	98.5	10
California.....	99,837	11,958	12	88	18
Oregon.....	60,518	3,328	5	95	35
Washington.....	42,703	3,465	8	92	53
Pacific Coast.....	203,048	18,751	9	91	30

It will be noted that Doctor Fernow finds the probable forest land to be 26 percent of the area of the whole United States, excluding nonadjacent territory, 52 percent of the New England states, 28 percent of the middle Atlantic states, 49 percent of the southern Atlantic states, 43 percent of the entire Atlantic Coast district, 50 percent of the gulf states, etc.

The estimate given by the author in table A, of the wooded area, is that it constitutes 35 percent of the entire area of the country. This "wooded area" is broader in its scope than the "forest area" according to Doctor Fernow, but otherwise the estimates are not far apart.

The presentation by Doctor Fernow may well be combined with the result of the inquiry made by the twelfth census (1900) as to the acreage and average quantity of timber per acre of timber land owned by lumbermen. This presentation was as follows:

TABLE E—TIMBER LANDS REPORTED OWNED BY LUMBERMEN—TWELFTH CENSUS.

STATES AND GROUPS.	Area in acres, according to ownership.	Average quantity merchantable timber per acre, in feet.	Estimated total quantity merchantable timber, in millions of feet.
United States.....	32,222,097	6,700	215,550.6
Eastern Group.....	4,498,812	4,700	20,987.3
Maine.....	2,107,606	2,000	4,317.5
New Hampshire.....	683,879	5,900	3,879.1
Vermont.....	372,754	7,300	2,746.2
Massachusetts.....	41,028	9,000	375.5
Rhode Island.....	1,673	3,000	6.3
Connecticut.....	9,195	9,200	89.8
New York.....	648,131	5,600	3,630.1
Pennsylvania.....	644,766	9,300	5,910.5
New Jersey.....	7,576	3,600	28.9
Delaware.....	2,204	5,000	10.4
Lake Group.....	6,694,153	4,900	32,925.0
Michigan.....	2,747,447	5,300	14,546.1
Wisconsin.....	1,920,607	5,400	10,387.8
Minnesota.....	2,026,099	3,900	7,991.1
Central Group.....	3,244,420	4,700	15,423.9
Ohio.....	80,699	4,100	334.8
Indiana.....	104,167	5,700	593.7
Illinois.....	162,652	4,800	778.0
West Virginia.....	506,069	5,200	2,608.4
Kentucky.....	882,649	4,700	1,767.2
Tennessee.....	1,138,649	3,900	4,496.1
Missouri.....	869,545	5,500	4,825.7
Southern Group.....	12,414,165	5,000	62,711.9
Maryland.....	66,928	3,700	250.1
Virginia.....	402,360	4,300	1,712.9
North Carolina.....	1,714,135	3,900	6,488.4
South Carolina.....	454,785	4,400	1,998.2
Georgia.....	1,107,838	3,900	4,212.2
Florida.....	1,318,387	4,500	5,918.5
Alabama.....	1,224,835	4,200	5,100.7
Mississippi.....	1,214,458	7,600	9,242.7
Louisiana.....	1,497,352	6,700	9,984.1
Arkansas.....	1,741,779	4,500	7,917.8
Texas.....	1,671,308	5,900	9,906.3

TABLE E—TIMBER LANDS REPORTED OWNED BY LUMBERMEN—TWELFTH CENSUS—Continued.

STATES AND GROUPS.	Area in acres, according to ownership.	Average quantity merchantable timber per acre, in feet.	Estimated total quantity merchantable timber, in millions of feet.
Pacific Group.....	3,188,149	24,500	78,141.6
California.....	1,177,537	30,600	36,087.7
Oregon.....	825,687	24,500	20,251.8
Washington.....	1,184,925	18,300	21,702.1
Miscellaneous Group.....	2,182,398	2,500	5,360.9
Colorado.....	91,993	7,300	671.1
Idaho.....	84,430	6,900	576.9
Indian Territory.....	32,347	3,900	126.5
Iowa.....	56,160	4,900	273.5
Kansas.....	7,690	3,500	28.4
Montana.....	95,538	6,600	632.8
Nebraska.....	.....	.....	.....
New Mexico.....	1,618,780	1,500	2,319.7
North Dakota.....	.....	.....	.....
South Dakota.....	5,940	3,000	18.3
Utah.....	19,300	2,100	40.6
Wyoming.....	56,960	4,500	254.3
Arizona.....	202,080	3,000	406.2
Alaska.....	.....	.....	.....
Oklahoma.....	10,940	1,300	14.6
Nevada.....	280	4,000	1.1

The average quantity of merchantable timber per acre in the ownership of lumbermen, as far as reported by them, was shown to be for the entire country 6,700 feet. Undoubtedly this average estimate per acre is much higher than the average for all the forest lands of the United States, for the reason that lumbermen have generally selected the best timber lands; but it is also probable that the report by the lumbermen underestimated the total quantities of timber owned by them by a considerable amount; for in almost every case lumbermen have estimates of only certain classes of timber on their land holdings, ignoring many species and qualities which will sooner or later be of material value and, in a consideration which recognizes not merely the customs of the day but the possibilities of the future, should be included in the total stand.

If, then, lumbermen report an average of 6,700 feet per acre, it is not improbable that the average of forest lands will, including all kinds of timber, be at least 4,000 feet to the acre. If that be a fair assumption, then Dr. Fernow's 26 percent of the total area of the country, or 1,902,416,000 acres, represents 1,978,512,640,000 feet of standing timber, or very close to the quantity arrived at by other methods of estimate.

THE ATLANTIC FOREST.

The eastern forest of the United States, which is a part of the grand eastern forest of the continent, originally covered nearly the entire area east of the Mississippi, the chief exceptions being open areas in Florida, Illinois and Wisconsin, and extended west of the river in solid masses in Minnesota, Missouri, Arkansas, Indian Territory, Louisiana and Texas. Southern Missouri, Arkansas and Louisiana were almost solidly timbered, except the last-named, which had a large prairie area along the Gulf Coast. The solid forest of Texas was confined to a comparatively small area in the eastern and northeastern part of the State. In addition there were extensions of the forest, usually along the streams or following some peculiar geological formation to the westward, and outlying parts of more or less importance. The plains and canyons of western Texas marked the extreme southwestern range of the eastern tree species, while in the northwest the limit is found in the foothills and outlying eastern extensions of the Rocky Mountains. In both of these regions the eastern and western forests touch hands, so to speak, though the representatives of both are there usually dwarfed and of comparatively little economic value except as supplying imperative local requirements.

Western Texas is peculiarly interesting from the standpoint of forest botany, because there meet and mingle representatives of extremely diverse types. Not only are the Atlantic and Pacific forests represented, but also the Mexican flora with many species of tropical and sub-tropical type. Of eastern species may be mentioned red cedar (*Juniperus virginiana*), black walnut, red mulberry, buckeye, persimmon, live oak, post oak and many others. Representatives of the Pacific forest are western yellow pine, Douglas spruce (*Pseudotsuga taxifolia*), white pine (*Pinus flexilis*), some western oaks, etc. Of the species of more southern origin are the Mexican walnut, Mexican madrona, gum elastic, lignum-vitæ, Texas ebony (*Zygia flexicaulis*), retama, green-bark acacia and various yuccas and cacti.

Southern Florida presents another interesting situation from the standpoint of tree species. While the northern part of the State has the characteristics of the forest regions of the North, the southern end of the Peninsula of Florida and the coast have the truly tropical vegetation, being an extension of the West Indian flora. The mahogany, the royal palm, the mangrove, the mastic and about sixty other West Indian species characterize it, in the words of Doctor Fernow, as tropic-

al in all but its geographical position. North of this tropical outpost is a semitropical district which extends in a narrow belt along the coast as far as North Carolina. It is characterized by evergreen broad-leaved trees, dwarfed palmetto, etc.

To facilitate discussion it is convenient to divide the area of the country into sections, according to their forest characteristics. The latest authority on the forest botany of North America, including forest distribution, is Sargent's manual of the trees of North America.⁶ It is in the main a condensation of his monumental work, "The Silva of North America." In this work Doctor Sargent uses for reference purposes an outline map of the continent, showing certain grand divisions. The line separating the eastern from the western, beginning at the North at the mouth of the Mackenzie River, passes east of the Rocky Mountains and their outlyers, through Alberta, Saskatchewan, the western portions of North Dakota, South Dakota and Nebraska, through eastern Colorado and New Mexico, and extreme western Texas.

The eastern area is subdivided into four regions, the largest of which is the northeastern, extending to the northern tree limit from a line beginning at the mouth of Chesapeake Bay, passing south of the Appalachians, north in western Tennessee and thence west, crossing Arkansas and Indian Territory. The next in point of size in the eastern regions is between the above described line and the Gulf. A third and very small one occupies the extreme southern end of Florida, and the fourth, also small, is on the Texas-Mexican boundary.

The western forest is also divided, on this scheme, into four parts. One, and the smallest, occupies the southern portions of New Mexico and Arizona and the southwestern extension of Texas. Its flora is of the Mexican type rather than that of the United States. North of this belt stretches the Rocky Mountain area to the Arctic. The third occupies California and Oregon, and the fourth includes Washington, part of Idaho, the western part of British Columbia along the coast, and Alaska to north of the Yukon River.

DIVISIONS OF THE ATLANTIC FOREST.

The above division is a very broad one, and the eastern forest proper should be more minutely subdivided. Ignoring its extensions north into Canada, on one scheme of division the eastern forest would be divided into three portions. One, coniferous in its characteristics,

⁶ "Manual of the Trees of North America," by Charles Sprague Sargent, director of the Arnold Arboretum of Harvard University, author of "The Silva of North America," Boston, 1905.

though almost everywhere mixed with the broad-leaved trees, stretches across New England, New York, northern Pennsylvania, Michigan and Wisconsin and into Minnesota. The continuity of this belt is broken by Lake Erie. Disregarding the international boundary, it is continuous east and west across the northeastern states, Quebec, Ontario and the district around Lake Superior. The characteristic woods of this coniferous belt are spruce and pine in the east and pine in the west, in some cases forming pure forests, but more generally intermixed with the hardwoods adapted to a northern climate.

PRINCIPAL EASTERN TREE SPECIES.

Immediately south of this coniferous belt was, and is, what may be called the central hardwood belt. In some sections the division between the two is sharply defined and in others confused. Furthermore, the northern coniferous belt has a prolonged but narrow extension southward along the Appalachians. The central hardwood belt finds its southern boundary along a line extending, approximately, from the mouth of Chesapeake Bay through North Carolina to the northwest corner of South Carolina, and thence in a general westerly direction across northern Alabama and Mississippi, north of the center of Arkansas to about the center of Indian Territory. South of this line the forest growth is of the coniferous type, though with a heavy admixture of hardwoods in the northern half of South Carolina, Georgia, Alabama, Mississippi and the southern half of Arkansas, and a lighter proportion nearer the ocean and Gulf. The remainder of the southern part of the eastern forest, comprising a belt of somewhat irregular shape and varying in width, extends along the south Atlantic and Gulf coasts from Maryland to eastern Texas, including parts of Virginia, half of North Carolina, South Carolina, Georgia, Alabama and Mississippi, practically all of Florida, Louisiana, the major part of Texas, including its heavy pine forests, and extending northward from Louisiana and Texas into Arkansas and Indian Territory. Such are, in brief, the outline divisions as given by Doctor Fernow.

Of the nearly 500 tree species native to the United States, about 230 species, excluding tropical ones, are represented in the Atlantic forest. Many of these trees, however, are of no present commercial value, or, at any rate, of no value for lumber purposes. Some are hardly more than shrubs—the distinction between shrubs and trees being a close and almost indefinite one. Of these eastern species of pine and hardwood trees, leaving out, of course, the yuccas, palms,

cacti and tropical hardwoods, seventy-two have been selected as having a present commercial value sufficient to warrant specific consideration, though among those omitted many will, undoubtedly, yet find place in the lumber industry. Of these species the pines contribute seven, the spruces two, the hickories seven, the poplars three, the birches four, the oaks thirteen, the elms three, the magnolias two, the maples four, the buckeyes two, the gums two, the ashes three; of individual species, larch, hemlock, fir, taxodium or bald cypress, red cedar, white cedar, juniper, butternut, walnut, beech, chestnut, tulip tree or yellow poplar, sweet gum, sycamore, black cherry, honey locust, locust, basswood, dogwood, and one of the catalpas—*Catalpa speciosa*.

Of the pines three are northern and four southern. Of the oaks under consideration nine may be classed as white oaks, including one live oak, and four as black oaks. There are fifty-four species of oaks in the United States, not counting subspecies or varieties. Of these, thirty-three belong to the eastern forest, while eight more may be classed with the eastern forest if its boundaries are extended to southwest Texas. Thus, of the thirty-three oak species in the Atlantic forest proper only thirteen are taken into consideration, though some others might be included, as they are already, to some extent, in lumber operations, and will be more extensively in the future. The following table shows the number of selected coniferous and broad-leaved species, respectively, in the different states embraced within the Atlantic or eastern forest:

STATE.	Coniferous.	Broad-leaved.	STATE.	Coniferous.	Broad-leaved.
Maine.....	11	30	Wisconsin.....	9	29
New Hampshire.....	11	30	Minnesota.....	8	29
Vermont.....	11	33	Kentucky.....	6	51
Massachusetts.....	10	36	Tennessee.....	8	51
Rhode Island.....	8	34	Missouri.....	3	46
Connecticut.....	8	37	Arkansas.....	4	48
New York.....	10	41	Indian Territory.....	3	34
New Jersey.....	7	36	Virginia.....	9	45
Pennsylvania.....	8	45	North Carolina.....	10	49
Delaware.....	8	36	South Carolina.....	8	41
Maryland.....	9	45	Georgia.....	8	44
West Virginia.....	7	45	Florida.....	6	33
Ohio.....	3	40	Alabama.....	8	44
Indiana.....	2	47	Mississippi.....	7	38
Illinois.....	2	48	Louisiana.....	5	34
Michigan.....	9	39	Texas.....	5	36

The above list is not absolutely complete even in the species selected, because some of them are so sparsely represented in some of the states that they have not been included in the lists for those states.

In Chapter II is given a list practically identical with the one now used, which gives the range of occurrence, including the extreme range and the sporadic instances as well. For example, the tulip tree or yellow poplar, which grows most numerous and to its best development in the valley of the Ohio River and its tributaries, is found native as far to the northeast as Vermont and Massachusetts, and, in fact, occurs in every state in the above list, except, perhaps, in Maine, New Hampshire, Wisconsin, Texas and Indian Territory. The localities in which the various selected species are the most common, or reach their best development, are, respectively, as follows :

White pine—New Hampshire, Vermont, New York, Pennsylvania, Michigan, Wisconsin and Minnesota.

Red pine—The above states, except Pennsylvania.

Jack pine—Michigan and Minnesota.

Loblolly pine—Virginia, North Carolina and Arkansas, though found in all the yellow pine states.

Shortleaf pine—Virginia, the Carolinas, Louisiana, Arkansas, Missouri and Texas.

Longleaf pine—South Carolina, Georgia, Florida, Mississippi, Alabama, Louisiana and Texas.

Cuban pine—Close to the coast in South Carolina, Georgia, Florida, Alabama and Mississippi.

Larch—Maine, Michigan, Wisconsin and Minnesota.

Black spruce—The New England states, New York, Pennsylvania and West Virginia.

White spruce—The New England states and New York.

Hemlock—New York, Pennsylvania, West Virginia, Michigan and Wisconsin.

Sargent remarks that it attains its largest size near streams on slopes of the high mountains of North Carolina and Tennessee.

Balsam fir—Northern New England, northern New York and northern Michigan and Minnesota.

Cypress—On delta lands of the south Atlantic and gulf states.

Northern cedar—Maine, New Hampshire, Vermont, New York, Michigan, Wisconsin and Minnesota.

Coast white cedar—From Massachusetts along the coast to Alabama.

Juniper—In middle Kentucky and Tennessee, northern Alabama and Mississippi.

Butternut—New England and the northern states generally.

Black walnut—Western slopes of the high Appalachians, the Ohio River Valley and in Indian Territory.

Pecan hickory—In southern Arkansas, Indian Territory and eastern Texas.

Bitternut hickory—On bottom lands of the lower Ohio basin.

Water hickory—On bottom lands of the lower Mississippi.

Shagbark hickory—On the western slopes of the southern Alleghenies, and in the basin of the lower Ohio.

Shellbark hickory—In the swamps of the lower Ohio and Mississippi rivers.

- Mockernut hickory**—A southern variety, growing to its best development in the basin of the lower Ohio, and in Missouri and Arkansas.
- Pignut hickory**—Is at best development in the same region as mockernut.
- Aspin**—A northern and mountain timber.
- Cottonwood**—In the valley of the lower Mississippi.
- Balsam poplar**—Along the northern boundary of the United States, not including Ohio, from Maine to Minnesota.
- Paper birch**—In northern New England and New York.
- River birch**—On the lowlands of the Gulf Coast.
- Yellow birch**—In New England and northern New York.
- Black birch, known also as cherry or sweet birch**—On the western slopes of the southern Appalachians and in Wisconsin, though common in all the northern states.
- Beech**—Widely distributed, but grows largest on intervale lands along the lower Ohio and on the slopes of the southern Alleghenies.
- Chestnut**—Most common south of Lake Erie and in southern Michigan, but grows to its best development on the mountains of North Carolina and Tennessee.
- White oak**—Found in every state. Has its best development on the western slopes of the southern Alleghenies and in the bottom lands of the lower Ohio basin.
- Post oak**—On dry, gravelly uplands of the Mississippi basin.
- Bur oak**—Southern Indiana and Illinois.
- Overcup oak**—In the lower Red River Valley of Arkansas and Louisiana. Rare in regions north of the Ohio River and on the Atlantic Coast.
- Chestnut oak**—A highland oak. On the lower slopes of the mountains of the Appalachians and Tennessee.
- Chinquapin oak**—Also a highland oak. On the lower Wabash River.
- Swamp white oak**—Western New York and northern Ohio.
- Cow oak**—On southern bottom lands.
- Live oak**—On the southern Atlantic and eastern Gulf coasts and in Texas.
- Red oak**—Reaches its largest development in the region north of the Ohio River.
- Yellow oak**—In the valley of the lower Ohio River.
- Spanish oak**—In the south Atlantic and gulf states on the dry hills between the coast plain and the Appalachian Mountains.
- Water oak (*Quercus nigra*)**—A southern bottom-land oak.
- Slippery elm**—In comparatively low, fertile soil in nearly all the country away from the Ocean and Gulf.
- White elm**—Most abundant on the banks of streams flowing through the mid-continental plateau.
- Cork elm**—In the southern peninsula of Michigan.
- Magnolia**—In Louisiana and similar situations in Mississippi.
- Cucumber tree**—In the narrow valleys at the base of the high mountains of the Carolinas and Tennessee.
- Tulip tree**—In the valleys of the lower Ohio basin and of the lower slopes of the higher mountains of North Carolina and Tennessee.
- Sweet gum**—In the maritime region of the south Atlantic states and in the basin of the lower Mississippi River.

Sycamore—On the bottom lands of streams in the basin of the lower Ohio and the Mississippi rivers.

Black cherry—On the slopes of the high Allegheny Mountains from Pennsylvania to Georgia.

Honey locust—In southern Indiana and Illinois.

Locust—On the western slopes of the Alleghenies in West Virginia.

Sugar maple—Vermont, northern and western New York, northern Ohio and Michigan.

Silver maple—On the banks of the lower Ohio and its tributaries.

Red maple—Most abundant in the South, especially in the valley of the Mississippi River, and of its largest size in the river swamps of the lower Ohio and its large tributaries.

Box elder—In the Mississippi basin generally, reaching its largest size in the valley of the lower Ohio.

Ohio buckeye—In the valley of the Tennessee River and in northern Alabama.

Yellow buckeye—On the high mountains of Tennessee and North Carolina.

Basswood—The lower Ohio River and its tributaries and in Mississippi.

Dogwood—Generally distributed through the middle and southern states.

Black gum—In the southern Appalachian region.

Cotton gum, or tupelo—In the cypress swamps of Louisiana and Texas.

Black ash—In damp locations through the northern states generally, and especially important in southern Illinois, Missouri and Arkansas.

White ash—On the bottom lands of the basin of the lower Ohio River.

Green ash—In the Mississippi basin.

Hardy catalpa (*Catalpa speciosa*)—In southern Illinois and Indiana.

For the above outline of the location of the best development of the various species, especial credit should be given to Doctor Sargent, in his "Manual of the Trees of North America."

THE NORTHERN CONIFEROUS BELT.

From the earliest times in the history of the United States until toward the end of the Nineteenth Century the northern coniferous timber belt constituted the basis of the chief supply of forest products for the domestic trade of the country and also entered largely into foreign trade, although an important commerce was founded upon the yellow pine of the south Atlantic Coast and Gulf states.

The early discoverers and explorers were struck by the wealth of the forest resources of the north Atlantic Coast, and particularly with the white pine, *Pinus strobus*. As has been related previously, the English Crown made reservations of the trees of this timber suitable for ships, masts and spars. The white pine grew in profusion in New England. It was seldom found in solid bodies of great extent, for it was usually mixed with spruce and other conifers and hardwoods, but the local or nearby supply was sufficient for all the demands of domes-

tic consumption and of foreign trade until well into the Nineteenth Century. This valuable wood grew, however, far to the west also. Interrupted only by Lake Erie, it stretched across the northern states from Maine to Minnesota.

Topography has much influence on the quantity of any given timber found in any region. In the East the uneven character of the surface, with alternations of bottom lands, valleys, hills and mountains, broke up the continuity of pine forests, allowing the introduction not only of other species of conifers, but of broad-leaved trees as well. In the West, on the contrary, in Michigan, Wisconsin and Minnesota, especially in the lower peninsula of Michigan, the more level character of a country adapted to the growth of white pine resulted in great stretches of almost pure pine forests, so that in the West was eventually developed the greatest pine industry. This development, however, was slow, depending upon the growth of population, the lessening of the supply progressively from east to west, and the opening of transportation routes.

Mixed with the white pine almost everywhere was red or Norway pine (*Pinus resinosa*). This was a happy combination, for what the white pine lacked in strength and hardness to suit it for certain structural and manufacturing uses, was supplied by this heavier wood, so that from early times they were cut together and often marketed together. These were the only pines of large commercial value of the northern United States, though there were others of decided value for local consumption or particular uses. One of these was *Pinus rigida*, a pitch pine whose range was along the Atlantic Coast. Another was *Pinus divaricata*, known as Jack pine in the United States, or Banksian pine in Canada.

It would be hardly worth the while to attempt an estimate of the original stands of white pine and red pine in the United States, though they furnished the basis of the leading lumber industry of the United States from the beginning until the end of the Nineteenth Century, and still are produced in quantities only second to yellow pine, with many years of a steadily declining output before them. There is very little virgin growth remaining in the United States in the eastern part of their range. But in 1899 New England produced about 800,000,000 feet, New York over 120,000,000 feet and Pennsylvania about 240,000,000 feet of white pine alone. This was practically all from second growth timber, whereas, the over 6,000,000,000 feet produced in Michi-

gan, Wisconsin and Minnesota was all cut from virgin timber, or was the cleaning up of areas previously lumbered. But as an industry of respectable dimensions has been maintained in the East on the basis of reproduction, so it is to be expected to be in the West. With a sharper delimitation between agricultural and forest lands, and an increase in the values of both standing timber and lumber, there will be a similar lengthening of the industry, though on a much smaller scale than now characterizes it.

The other most important conifers of the northern coniferous belt include the larch, or tamarack (*Larix laricina*), the two spruces, white and black, the hemlock, the balsam fir and the cedar. The larch found its favorite locations in the swamps of Maine, northern Michigan and Minnesota. In the first-named State it was valuable for shipbuilding. The spruces were for a while neglected, but as the supply of pine decreased they came into prominence, and by their superior powers of reproduction and more rapid growth became the leading timber wood of New England and New York. The development of the pulp industry also gave an added importance to spruce. The hemlock found its favorite localities in western New York, Pennsylvania, West Virginia, Michigan and Wisconsin.

All these conifers, except the white spruce (*Picea canadensis*), larch and Jack pine, found altitude a substitute for latitude and so extended southward along the Appalachians, continually rising higher until their southern limit is found on the higher altitudes of the mountains of western North Carolina and eastern Tennessee. The stand of all of these woods is decreasing, unless it be of the spruce, which, when protected from fire, rapidly replaces itself. White pine and red pine, however, still exist in considerable bodies, though exact information as to their quantity is not obtainable. Estimates of standing pine in Minnesota, for example, vary from 20,000,000,000 to 40,000,000,000 feet; in Wisconsin, from 10,000,000,000 to 20,000,000,000 feet, and so on. It seems probable that an estimate of 50,000,000,000 to 60,000,000,000 feet for the entire country is not, in 1905, too high.

ORIGINAL DISTRIBUTION.

The original distribution of forests within the northern coniferous belt was briefly but very satisfactorily outlined by Doctor Charles S. Sargent in his "Forests of the United States," published in 1884. While the statements in that work in regard to the probable future of the lumber industry were proven by subsequent history to be faulty in

many cases, wherever he dealt with matters of demonstrable fact, especially those coming within the province of the student of American forest botany, his work stands practically unchallenged. From this work are drawn the following statements :

Maine—The forests of the northern pine belt extended over the State of Maine. Pine and spruce, with which were mingled maple, birch and other deciduous trees, covered the entire State, with the exception of the immediate coast region between the Kennebec and the Penobscot rivers, a region of hardwood forest. Hemlock was common. Hardwood timber is particularly fine and abundant through the central portion of the State; farther north the forest is more generally composed of coniferous trees.

New Hampshire—The forests of New Hampshire were originally composed of a belt of spruce, mixed with maple, birch and other hardwood trees, occupying all the northern part of the State and extending southward through the central portion. The southeastern part of the State and the region bordering the Connecticut River were covered with forests of white pine, through which considerable bodies of hardwood were scattered.

Vermont—The forests of Vermont, as compared with those of New Hampshire and Maine, are varied in composition. About the shores of Lake Champlain several western trees first appear, and throughout the State the forest is more generally composed of deciduous than coniferous species. Forests of spruce, however, spread over the high ridges of the Green Mountains, their foothills being covered with hardwood trees, a little pine or hemlock occurring in the valleys. A forest of white pine stretched along the banks of the Connecticut, and great bodies of this tree occurred in the northwestern part of the State, adjacent to Lake Champlain.

New York—That portion of the State north of the forty-third degree of latitude, including within its limits the elevated Adirondack region, was covered with a dense forest of maple, birch, basswood and other northern deciduous trees, through which were scattered spruce and pine. The low hills bordering the Hudson and extending along the southern boundary of the State west of that river were covered with the coniferous species of the northern pine belt. Over the remainder of the State the broad-leaved forests of the Mississippi basin spread almost uninterruptedly, except where an occasional sandy plain or high elevation favored the growth of pines.

Pennsylvania—Pennsylvania possessed vast forests of white pine and hemlock stretching over both flanks of the Allegheny Mountains and extending from the northern boundaries of the State to its southern limits. East and west of the Allegheny region the whole country was covered with a heavy growth of broad-leaved trees mixed with hemlocks, and occasional groves of pines. Originally the broad pine belt of northern Pennsylvania occupied the region drained by the numerous streams constituting the headwaters of the Susquehanna, extended from Susquehanna County, in the northeastern corner of the State, westward through Bedford and Tioga counties to Potter County, and thence southwestward over Cameron, Elk and Clearfield counties. The heaviest growth was in the southwest part of Tioga County.

Michigan—Michigan possessed a tree covering of great density, richness and variety. The hardwood forests of the Ohio Valley covered the southern portion of the State, extending to just north of the forty-third degree of latitude. North of this hardwood belt the character of the forest changed; the white pine appeared, occupying the drier and more gravelly ridges, and, gradually increasing in size and frequency, became the most important element in the forests of the central and northern portions of the Southern Peninsula. In the Northern Peninsula, especially in the basin of the Menominee River, it covered the sandy plains almost to the exclusion of other species. The forests of hardwood, occupying low, rich soil between the pine-covered ridges, were valuable in their stores of sugar maple, birch, ash, beech, oak and other northern trees, while the swamps common in the northern part of the State abounded in tamarack and yellow cedar of large size and excellent quality. North of the central portion of the Lower Peninsula large tracts of barren plains exist.

Wisconsin—The great prairies of the central Atlantic region once found their northeastern limits in southern Wisconsin. The forest covering of all the southern part of the State was confined to the bottom lands or open upland groves of stunted oaks of no great extent or of more than local importance. The central part of the State was covered with a dense forest of hardwoods, oaks, ash, maple, cherry, birch and the other trees of the northern forest, through which, upon gravelly or sandy ridges, great bodies of white pine were scattered.

Minnesota—The northern pine belt finds in Minnesota its extreme western limit in the United States in longitude 95 degrees 30 minutes, and its southwestern limit near the forty-sixth degree of latitude. Along its southern and western borders a narrow territory covered with an open growth of hardwood separates the forests of pine from the prairie, which occupies all the southern and western portions of the State. The pine in the southern portion, confined to gravelly ridges, is scattered through forests of hardwood. Farther north the forest changes in character. Broad areas of barren land covered with birch, gray pine and scrub oak occur, while the whole country is thickly studded with lakes and with tamarack and cedar swamps. North of the Mississippi River divide the country is more open; pine is found mixed with spruce, tamarack and yellow cedar.

COMMENTS OF EARLY TRAVELERS.

All the early explorers and travelers in the eastern United States noted the abundance and high utility of white pine. Michaux, who well may be called the father of American forest botany, in his "North American Sylva" devoted much space to this wood. In regard to its habitat, he said:

"It appears to be most abundant between the forty-third and forty-seventh degrees of latitude. Farther south it is found in the valleys and on the declivities of the Alleghenies to their termination, but at a distance from the mountains on either side its growth is forbidden by the warmth of the climate. It is said, with great probability, to be multiplied near the source of the Mississippi, which is in the same

latitude with the District of Maine, the upper part of New Hampshire, the State of Vermont and the commencement of the St. Lawrence, where it attains to the greatest dimensions."

He mentions having measured two trunks felled for canoes in the Kennebec River in Maine, one of which was 154 feet long and fifty-four inches in diameter, and the other, 142 feet long and forty-four inches in diameter, three feet from the ground. He also saw near Hallowell, Maine, a stump exceeding six feet in diameter. In regard to its abundance he says: "When I was at Winslow [Maine] in 1806, the river was still covered with thousands of logs of which the diameter of the greater part was fifteen or sixteen inches and that of the remainder (perhaps one-fiftieth of the whole), twenty inches. The blue ash and the red pine were the only species mingled with them, and these in not the proportion of one to a hundred."

He wrote from personal observation of the white pine of New England, New York and Pennsylvania. He says: "The upper part of Pennsylvania near the source of the Delaware and Susquehanna, which is mountainous and cold, possesses large forests of this pine. . . . Beyond the mountains, near the springs of the river Allegheny, from 150 to 180 miles from its junction with the Ohio, is cut all the white pine destined for the market of New Orleans, which is 2,900 miles distant."

The great forests of white pine have most of them disappeared, and small indeed is the volume of production which compares in size and quality with that of old days; still this wood remains and will remain an important contributor to the wealth of the country.

But the conifers were not the only inhabitants of this northern timber belt. Of the hardwoods of commercial importance New England had walnut, butternut, three varieties of hickory, four or five poplars, four varieties of birch, beech, chestnut, six or seven of oak, three of elm, beech, cherry, four of maple, two of ash; while representatives of other families were to be found. In fact, the tulip tree, or yellow poplar, was found to a limited extent and of inferior growth in western New England. One variety of gum, the basswood and the dogwood, were also native. Farther west, the valley of the Hudson and the rich bottom lands and well drained hill sides of New York and Pennsylvania carried more varied and much richer growths of hardwoods.

Professor Kalm,⁷ writing about the middle of the Eighteenth Century, gave what he called a "small catalogue of the trees which grow

⁷ "Travels in North America," by Professor Peter Kalm, 1749.

spontaneously in the woods nearest Philadelphia." He named three conifers, one of which was *Pinus tæda*, which he called the New Jersey fir tree, but which is now known as loblolly pine, and more than twenty species of broad-leaved trees. Recounting a trip via the Hudson to Allegheny, he said: "The trees which grow along the shores and on the adjacent hills within our sight today [June 24, 1749] are elms, birch, white firs, alders, dog trees, lime trees, red willow and chestnut trees."

The Duke de le Rochefoucault Liancourt, during his travels in America in 1795, in speaking of western New York, says: "The woods are thick and lofty, sugar maple, black birch, oak, hickory, hemlock-fir and beech are the most prevailing trees." He throws a ray of light on the lumber market of those primitive days, for he tells of a land owner and inn-keeper at Watkinstown, New York, who cut 4,500 feet of boards daily, which were sent on the lake to Canandaigua, where they were sold for ten shillings a thousand feet.

Space forbids more than the briefest description of this northern coniferous belt. Suffice it to say that it stretched in a solid body of forest from the Atlantic to the Mississippi and that where the conifers were not found they were replaced by an equally luxuriant and, if possible, more valuable growth of hardwoods. The coniferous areas proper will, to a considerable extent, remain for an indefinite time devoted to timber growth, but the hardwood areas already have been largely cleared and will almost all, in course of time, be given over to agriculture, except as the exigencies of the lumber markets may warrant the devotion of a small percentage of their area to tree culture.

THE CENTRAL HARDWOOD BELT.

Perhaps the most valuable hardwood section of the United States, which may be called the "central hardwood belt," is that great interior section of the eastern forest whose outlines have been briefly given on a previous page. A sharp definition of the boundaries between this area and the forests of coniferous type which surround it on the north, east and south is impossible, for in some sections the types gradually merge into each other, and in others, where the line is sharp, it is too irregular to permit of description in the space available; but it may be thus roughly, and in a somewhat general way, described:

Beginning at Niagara it would run east and then south, passing through central New Jersey; thence southwest, following the eastern and southern edge of the Piedmont Plateau to a point north of the center of Alabama; thence in a general westerly direction into Indian

Territory, thence north through the Territory to, approximately, its northeastern corner, thence in a general northeastern direction across Missouri, Illinois and the extreme northwest corner of Indiana, thence swinging around northeast and east to Lake St. Clair.

The territory thus included embraces western New York, parts of New Jersey, Delaware and Maryland, the western portions of Virginia, North Carolina and South Carolina, the northern portions of Georgia, Alabama, Mississippi and Arkansas, the eastern part of Indian Territory, the southern part of Missouri and Illinois and the southern third of the southern peninsula of Michigan. Entirely included within this boundary are Pennsylvania, Ohio, Indiana, West Virginia, Kentucky and Tennessee.

It must be admitted that too much, from certain standpoints, is included. Western New York, while wonderfully rich in broad-leaved trees, had considerable areas of pine and hemlock; the fame of Pennsylvania in the lumber industry has been based upon its pine and hemlock rather than upon its hardwoods; West Virginia and western Maryland had large quantities of hemlock and spruce and a little pine, all of these conifers, further, extending along the higher altitudes of the Appalachians as far as Georgia. Arkansas had, and has, a mixed growth of pine and hardwoods, with pine predominating in the southern part of the State and hardwoods in the north and through the eastern bottom lands. Missouri also had an extensive pine area in the southeastern part of the State. The southern boundary of this hardwood region is as difficult of exact definition as its northeastern boundary, for in the south Atlantic and gulf states the conifers, which furnish almost pure stands toward the coast, almost imperceptibly merge into the hardwood forests as one moves toward the interior, the Piedmont Plateau being a region of mixed pine and hardwoods, while, on the other hand, the river bottoms in the pine districts proper are often filled with very heavy growths of hardwoods suitable to such locations.

Probably nowhere in the world is there a forest growth which more fully meets all the needs of man than does that found in this hardwood forest of America. A more restricted area, including Ohio, Indiana, West Virginia, Kentucky, Tennessee and southern Illinois, is, perhaps, nowhere else equaled in the quantity and valuable quality of its original arboreal wealth. Here were found the light, soft and easily worked woods, such as cottonwood, basswood and tulip; woods of strength, such as the hickories, maples and oaks; woods of beauty, like

the walnut, cherry, maple and oak—in short, woods to meet almost every conceivable requirement of the pioneer settler or of the highest civilization. In quantity, quality and variety this forest was almost unique. It has been said that the ordinary farm in the valley of the Wabash River would contain more varieties of broad-leaved trees than are to be found in the whole of Europe. Out of the comparatively few species selected for especial mention in this chapter, West Virginia had forty-five; Ohio, forty; Indiana, forty-eight; Illinois, forty-eight; Kentucky, fifty-one, and Tennessee, fifty-one.

In all this forest, oak, with its many varieties, was, and is, the everywhere present factor; and, notwithstanding the inroads of the sawmill, the stave mill or the stave river, and of the tie-maker, *Quercus* will undoubtedly in the long run more than hold its own in comparison with other woods. One of the most valuable trees was the black walnut, whose range was wide, occurring in every state of the Atlantic forest, but growing in special profusion and of the finest quality in the hardwood belt proper. But this tree, once so plentiful that it was the favorite wood, because of its straight grain and easy cleavage, for furnishing fencing and structural material for the early settlers, and later prized as the most valuable cabinet wood native to the United States, has almost disappeared. An industry of some importance is still based upon the small tracts or isolated specimens still remaining, and will be continued in the utilization of second-growth timber—for the walnut is a tree readily propagated and one which grows rapidly. But the percentage of this tree now in the forests is, and probably will remain, insignificant.

The third of the species of most importance is the tulip tree, or so-called yellow poplar (*Liriodendron tulipifera*). This tree grew in extraordinary profusion and of fine quality in Indiana and western Tennessee and on intervalle lands on the western slopes of the Appalachians. Only in the last-named section does it now remain an important factor in the forests.

To name the broad-leaved trees of this forest is to name all the species of value to be found in North America, except a few on the Pacific Coast and in Mexico. Early travelers through what then were the wilds of the interior always were impressed with the variety and luxuriance of this hardwood forest; they might have appreciated the wonderful scope and value of the coniferous forests, but there was an atmosphere abiding under the shade of the broad-leaved trees which

impressed itself with peculiar force upon minds attuned to the majestic and beautiful in nature. Speaking on this subject a recent writer⁸ says:

Of the broad-leaf forests there are many types. There are forests of oak and chestnut; of maple and beech; dry upland forests and the tangled woods of the swamps. There are young thickets of birch and aspen; of willow and alder and scrubby oak barrens. There are second-growth forests, and now and then even a patch of fine old virgin timber. In size, also, there is a great difference, from the grove that covers the hilltop to the unbroken forest that stretches over an entire mountain range.

It appears, therefore, that *variety* is one of the marked characteristics of our eastern woods. As several hundred different kinds of trees enter into their composition under every form and modification of circumstances, we find in these woods an endless novelty and perennial freshness. . . .

Let us imagine ourselves standing, for instance, on some point of vantage in the Blue Ridge, of Virginia, the season being early May. The view extends across ranges of low, rounded mountains, which are fresh with the new foliage of spring. On the nearest hill the individual trees and their combinations into groups can be distinguished; but receding into the valleys and more distant slopes the forms and colors grow less distinct, till the tone becomes darker and at last melts into the familiar hazy blue of distant hills. Looking again at the nearer hill-sides we recognize the tulip trees with their shapely crowns, clothed in a soft green and lifted somewhat above the general outline. The light green of the opening elms and sweet gums can be very well distinguished beyond the more shadowy beeches, ashes and maples. The remaining spaces are occupied by hickories and chestnuts, still brown and leafless, and by rusty-hued oaks which are only just beginning to break their buds. Within the leafless portions of the wood an occasional dash of bright yellow or creamy white not quite concealed, shows where the sassafras or dogwood is in bloom. The crests and ridges, however, are likely to be occupied by groups and bands of pines, while the sides of the mountain brook will be studded with cedars and hemlocks.

OBSERVATIONS OF EARLY TRAVELERS.

As a matter of course the forests which lay along the route of early exploration and travel and adjoining the primitive settlements, first came under notice and were especially commented on. Previous quotations have been made from Peter Kalm, who wrote in 1749 regarding a visit to America. Describing a trip from Chichester to Philadelphia, he said that the oaks were the most plentiful trees in the woods, and that there were several species of them, all different from European oaks. Further he said:

The red maple, or *Acer rubrum*, is plentiful in these places. . . . Out of its wood they make plate spinning wheels, rolls, feet for chairs and beds and all sorts of work. With the bark they dye both worsted and linen, giving it a dark

⁸ "Forest Trees and Forest Scenery," by G. Frederick Schwarz, New York, 1901.

blue color. . . . When the tree is felled early in the spring a sweet juice runs out of it, like that which runs out of our birches. This juice they do not make use of here, but in Canada they make both treacle and sugar of it. There is a variety of this tree which they call the curled maple, the wood being as it were marbled within; it is much used in all kinds of joiners' work, and utensils made of this wood are preferable to those made of any other wood in the country.

Writing from Fort Anne, he said: "The American elm (*Ulmus americana* Linn.) grows in abundance in the forests hereabouts. There are two kinds of it. One is called white elm, on account of the inside of the tree being white. It is more plentiful than the other species which is called the red elm."

George Washington, in his campaign against the French in 1753, passed through the upper Ohio Valley, and remarked that the territory was covered with forests of hickory, walnut, ash, poplar, sugar maple and wild cherry trees. One of the earliest of American forest botanists was Humphrey Marshall, of Philadelphia, who published in 1785 a work entitled, "Arbustum Americanum." His observations were apparently limited to the eastern and northeastern states, but some of the comments he makes as to the favorite habitat of trees are decidedly interesting. He calls the yellow poplar the "Virginian tulip tree," which he credits with a height of seventy to eighty feet and a diameter of four feet. He gives the favorite location of the evergreen magnolia as Florida and South Carolina. The tupelo (*Nyssa aquatica*) he describes as growing to large size in the swamps of Carolina and Florida and as very abundant upon the Mississippi River. The upland tupelo, or sour gum, he says, grows naturally in Pennsylvania, and "perhaps" elsewhere.

The Duke de le Rochefoucault Liancourt, writing in 1795 in regard to the trees of South Carolina, says: "The luxuriance of the woods stand unrivaled; there are eighteen different species of oak, particularly the live oak, the palmetto or cabbage tree, the cucumber tree, deciduous cypress, liquidambar, hickory, etc. In short, all the species of trees which are so excessively dear in Europe." Of Virginia he says:

Among the numberless species of trees which grow in Virginia are distinguished the silver-leaved maple, the ash-leaved maple, the catalpa, the Carolinian allspice, the judas tree, the Virginian mespilus [a thorn or haw tree], of which I have seen some twenty-five feet in height, corneltrees of different sorts, the persimmon, the nickertree, the triacanthos, walnut, various species of cedar, sweet bay, benjamin tree, the maple-leaved liquidambar, the evergreen laurel-leaved

tulip tree [probably the *Magnolia latida*], the swamp pine and many others, the black and Carolina poplar, various species of oak, etc., but many of them, the tulip tree for instance, do not attain the same height in Virginia as in South Carolina and Georgia. Although Virginia does not produce some trees, which grow only under a higher degree of latitude, yet it contains, in my opinion, a greater variety of species than any other state.

One Norris Birkback, in a work entitled "Notes of a Journey in America," published in 1817, has some interesting comments on the forests of Ohio, where he was particularly impressed with the oaks and sycamores. He may be quoted as follows :

Trees are very interesting objects to the American traveler. They are always beautiful and, in the rich bottoms, they sometimes exhibit a grand assemblage of gigantic beings, which carry the imagination back to other times, before the foot of a white man had touched the American shore. Yesterday, June 18, 1817, I measured a walnut almost seven feet in diameter, clean and straight as an arrow, and just by were rotting, side by side, two sycamores of nearly equal dimensions. The sycamores grow in bottoms liable to be overflowed, to an unwieldy bulk, but the white oak is the glory of the upland forest. . . . I measured a white oak by the roadside which at four feet from the ground was six feet in diameter, and at seventy-five feet it measured nine feet around, or three feet in diameter.

Writing from notes made at Chillicothe, Ohio, he says : " Before we entered on the flat country were some hills covered with the grandest white oak timber, I suppose, in America. There are thousands, I think, of these magnificent trees within view of the road for miles, measuring fourteen or fifteen feet in circumference, their straight stems rising without a branch to the height of seventy or eighty feet, not tapering and slender, but surmounted by full, luxuriant heads."

In regard to the famous valley of the Wabash River, Maximilian, Prince of Wied, about 1833, wrote :

Some remarkable peculiarities strike the observer when he looks at the forests on the Wabash. One of these is the want of evergreens. . . . The planes [sycamores] often attain an enormous size and are then generally hollow and divided into several colossal branches. We measured several of these trees and found one that was forty-one feet five inches in circumference. The hollow inside was twelve feet in diameter, so that in our winter excursions we used to light a fire in it, where we were sheltered from the wind. Tall tulip trees shoot up straight as masts, blossom and bear seed at their summits, unseen by human eye. Maples of great height and circumference, many species of oak, especially mossy overcup oak (*Quercus macrocarpa*), with its large acorns, which at this time lay on the ground, stand crowded together. A great many species of trees are mixed together, among them the *Gymnocladus canadensis* or *Guilandina bonduc* [coffeetree], with its broad pods, the divers kinds of walnut trees, the *Gleditsia triacanthos* [honey locust], with its formidable thorns and many climbing plants twined round the

trunks. The inhabitants of these forests would never be in want of an ample supply of wood for fuel and for timber if they had been at all careful. The black walnut and cherry tree wood are the best for cabinet work, and for fuel the hickory, which affords more wood than beech wood. The price of wood at Harmony was \$1 for a cord, but the price is already rising, because the forest in the neighborhood of the village is gradually being cleared and the carriage is more expensive.

Commenting upon the Ohio Valley, he says: "The woods in the valley of the Ohio are more lofty and luxuriant than on the other side of the Allegheny Mountains."

MICHAUX ON DISTRIBUTION OF HARDWOODS.

Most interesting and valuable observations as to the ranges and habitat of American hardwoods a hundred years ago are found in the writings of F. André Michaux, for he and his father, André Michaux, to whose work he succeeded, covered most of the territory east of the Mississippi River. Somewhat liberal quotations from this authority will be pardoned. It should be noted that the botanical names he uses do not in all cases agree with present nomenclature.

White oak (*Quercus alba*)—In the District of Maine, Vermont and Lower Canada it is little multiplied and its vegetation is repressed by the severity of the winter. In the lower part of the southern states, in the Floridas, and in lower Louisiana, it is found only on the borders of the swamps with a few other trees which likewise shun a dry and barren soil. The white oak is observed to be uncommon on the lands of extraordinary fertility like those of Tennessee, Kentucky and Genesee [western New York]. The white oak abounds chiefly in the middle states, and in Virginia, particularly in that part of Pennsylvania and Virginia [now West Virginia] which lies between the Alleghenies and the Ohio River. Beginning at Brownsville, on the Monongahela, I have seen large forests, nine-tenths of which consisted of white oaks. In the western districts, where it composes entire forests, the face of the country is undulated and the yellow soil, consisting partly of clay with a mixture of calcareous stones, yields abundant crops of wheat.

Overcup oak (*Quercus lyrata*)—In the United States I have met with this interesting species only in the lower part of the Carolinas and of Georgia. The overcup oak grows in more humid situations than any other species of this genus in the United States. It expands to a majestic size and the influence of the deep and constantly humid soil is shown in the luxuriance of its vegetation. On the banks of the Savannah I have seen stocks which were more than eighty feet high and from eight to twelve feet in circumference.

Red oak (*Quercus rubra*)—In the lower part of New York, in New Jersey, the upper districts of Pennsylvania and along the whole range of the Alleghenies it is nearly as abundant as the scarlet and black oaks, but it is much less common in Maryland, the lower part of Virginia and the maritime parts of the Carolinas and Georgia. The red oak is a tall, widespreading tree, frequently more than eighty feet high and three or four feet in diameter.

Black walnut (*Juglans nigra*)—East of the Allegheny Mountains in Virginia, and in the upper part of the Carolinas and of Georgia it is chiefly confined to the valleys where the soil is deep and fertile and which are watered by creeks and rivers. In the western country, in Genesee, and in the states of Ohio and Kentucky, where the soil in general is very rich, it grows in the forests with the coffee-tree, honey locust, red mulberry, locust, shellbark hickory, black sugar maple, hackberry and red elm, all of which trees prove the goodness of the soil in which they are found. It is in these countries that the black walnut displays its full proportions. On the banks of the Ohio and on the islands of that beautiful river I have often seen trees of three or four feet in diameter and sixty or seventy feet in height. It is not rare to find them of the thickness of six or seven feet.

Butternut (*Juglans cathartica*)—The butternut is found in Upper and Lower Canada, in the districts of Maine, on the shores of Lake Erie, in the states of Kentucky and Tennessee and on the banks of the Missouri; but I have never met with it in the lower part of the Carolinas, of Georgia, and of East Florida. In cold regions, on the contrary, its growth is luxuriant; for in the State of Vermont, where the winter is so rigorous that sledges are used during four months in the year, this tree attains a circumference of eight or ten feet. I have nowhere seen it more abundant than in the bottoms which border the Ohio between Wheeling and Marietta.

Pecannut hickory (*Juglans olivæformis*)—On the borders of the rivers Missouri, Illinois, St. Francis and Arkansas it is most abundantly multiplied. It is also common on the river Wabash. On the Ohio it is found for 200 miles from its junction with the Mississippi; higher than this it becomes more rare and is not seen beyond Louisville. My father, in traversing this country, learned from the French inhabitants, who ascend the Mississippi in quest of furs, that it is not found on that river beyond the mouth of the Mackakalety [Maquoketa?], which discharges itself in the latitude of 42.51.

Mockernut hickory (*Juglans tomentosa*)—It is most abundant in the forests that still remain on the coast of the middle states and in those which cover the upper parts of the Carolinas and of Georgia, but in the last-mentioned states it becomes more rare in approaching the sea. I have noticed, however, that this is the only hickory which springs in the pine barrens.

Shellbark hickory (*Juglans squamosa* or *Carya alba*)—It abounds on the shores of Lake Erie about Geneva, in Genesee, along the river Mohawk, in the neighborhood of Goshen in New Jersey, and on the banks of the rivers Susquehanna and Schuylkill in Pennsylvania. In Maryland, in the lower parts of Virginia, and in the other southern states it is less common.

Pignut hickory (*Juglans porcina*)—In the Atlantic parts of the middle states it helps with the mockernut hickory, white oak, swamp white oak, sweet gum and dogwood to form the mass of the forests. In the southern states, especially near the coast, it is less common.

White maple (*Acer eriocarpum* or *Acer dasycarpum*) [soft maple]—In no part of the United States is it more multiplied than in the western country and nowhere is its vegetation more luxuriant than on the banks of the Ohio and of the great rivers which empty into it. Beginning at Pittsburg, and even some miles above the junction of the rivers Allegheny and Monongahela, white maples twelve and fifteen feet in circumference are continually met with at short distances.

Red flowering maple (*Acer rubrum*)—I have nowhere observed it of as ample dimensions as in Pennsylvania and New Jersey. In those states exist extensive marshes, called maple swamps, exclusively covered with it, where it is found seventy feet high and three or four feet in diameter.

Sugar maple (*Acer saccharinum*)—It is nowhere more abundant than between the forty-sixth and forty-third degrees, which comprise Canada, New Brunswick, Nova Scotia, the states of Vermont and New Hampshire and the District of Maine. In these regions it enters largely into the composition of the forests, with which they are still covered. Farther south it is common only in Genesee, in the State of New York, and in the upper parts of Pennsylvania. It is estimated by Doctor Rush that in the northern parts of these two states there are 10,000,000 acres which produce these trees in the proportion of thirty to an acre. The sugar maple covers a greater extent of the American soil than any other species of this genus. In the United States maple sugar is made in the greatest quantities in the upper part of New Hampshire, in Vermont, in the State of New York, particularly in Genesee, and in the counties of Pennsylvania which lie on the eastern and western branches of the Susquehanna. A great deal of sugar is also made in Upper Canada, on the Wabash, and near Michill Mackinac.

Large flowered magnolia or big laurel (*Magnolia grandiflora*)—It is first seen in the lower part of North Carolina near the River Nuse in the latitude of 35 degrees 31 minutes; proceeding from this point it is found in the northern parts of the southern states, and of the Floridas, and as far up the Mississippi as Natchez 300 miles above New Orleans.

Loblolly bay—The loblolly bay is confined within the same limits with the long-leaved pine, being confined to the lower parts of the southern states, to the two Floridas and to lower Louisiana. It is very abundant in the branch swamps and attains greater proportions than the red bay, swamp bay and black gum, with which it is usually associated.

Poplar, or tulip tree (*Liriodendron tulipifera*)—The southern extremity of Lake Champlain in latitude 45 degrees may be considered as the northern limit, and the Connecticut River, in the longitude 72, as the eastern limit of the tulip tree. It is multiplied in the middle states in the upper parts of the Carolinas, Georgia and still more abundantly in the western country, particularly in Kentucky. The western states appear to be the natural soil of this magnificent tree. It is commonly found mingled with other trees, such as the hickories, the black walnut, butternut, and the wild cherry tree, but it sometimes constitutes alone pretty large tracts of the forests, as my father observed in Kentucky, on the road from Beard Stone to Louisville. In no other part of the United States did he find the tulip trees so lofty and of such great diameter. He measured one which, at five feet from the ground, was twenty-two feet six inches in circumference and whose elevation he judged to be from 120 to 140 feet. The nature of the soil has such a striking influence upon the color and upon the quality of the tulip tree that mechanics who employed it have made the remark, and have distinguished it by the names of white poplar and yellow poplar.

Sweet gum (*Liquidambar styraciflua*)—On the seashore it is seen toward the northeast between Portsmouth and Boston in latitude 43 degrees 30 minutes; and it is found as far as old Mexico toward the southwest; from the coast of Virginia it

extends westward to the Illinois River, thus spreading over more than two-thirds of the ancient territory of the United States, together with the two Floridas, upper and lower Louisiana and a great part of New Spain.

Buttonwood or sycamore (*Platanus occidentalis*)—The nature of the buttonwood confines it to moist and cool ground where the soil is loose, deep and fertile. The buttonwood is in no part of North America more abundant and more vigorous than along the great rivers of Pennsylvania and Virginia, though in the more fertile valleys of the West its vegetation is, perhaps, still more luxuriant, especially along the banks of the Ohio and the rivers which empty into it. On a little island in the Ohio fifteen miles above the mouth of the Muskingum, my father measured a buttonwood which, at five feet from the ground, was forty feet four inches in circumference, and, consequently, more than thirteen feet in diameter. Twenty years before, General Washington had measured the same tree and found it to be of nearly the same size. In 1802, in a journey through the western states, I found on the right bank of the Ohio, thirty-six miles from Marietta, a buttonwood whose base was swollen in an extraordinary manner. My traveling companion and myself measured it, and at four feet from the ground we found it to be forty-seven feet in circumference. A buttonwood of equal size is mentioned as existing in Genesee.

Canoe birch (*Betula papyracea*)—The canoe birch is most multiplied in the forests in the country lying north of 43 degrees latitude and between 75 degrees of west longitude and the Atlantic Ocean, comprising the lower part of New Brunswick, the District of Maine and the states of New Hampshire and Vermont.

Black birch (*Betula lenta*)—In Massachusetts, Connecticut and New York it is next in esteem to the wild cherry tree among cabinet makers in the country.

Locust (*Robinia pseudacacia*)—The locust is mostly multiplied in the Southwest, and abounds in all the valleys between the chains in the Allegheny Mountains, particularly in Limestone Valley. It is also common in all the western states, and in the territory between the Ohio and Illinois rivers, and the Lakes and the Mississippi.

Wild cherry tree (*Cerasus virginiana*)—It is nowhere more profusely multiplied nor more fully developed than beyond the mountains in the states of Ohio, Kentucky and Tennessee. On the banks of the Ohio I have measured stocks which were from twelve to sixteen feet in circumference and from eighty to 100 feet in stature.

American chestnut (*Castanea vesca*)—It is most multiplied in the mountainous districts of the Carolinas and of Georgia and abounds on the Cumberland Mountains and in East Tennessee. The coolness of the summer and the mildness of the winter in these regions are favorable to the chestnut.

White beech (*Fagus sylvestris*)—Most multiplied in the middle and western states. It is common in New Jersey, Pennsylvania, Maryland and throughout the country east of the mountains. I found the finest beeches on the banks of the Ohio, between Gallipolis and Marietta.

Black gum (*Nyssa sylvatica*)—In all the more southern states, both east and west of the Allegheny Mountains, it is more or less multiplied, as the soil is more or less favorable to its growth. It is designated by the names of black gum, yellow gum and sour gum.

White ash (*Fraxinus americana*)—It sometimes attains the height of eighty feet with a diameter of three feet and is one of the largest trees of the United

States. This wood is highly esteemed for its strength, suppleness and elasticity and is employed with advantage for a great variety of uses.

White elm (*Ulmus americana*)—This tree is found over an extensive tract of the North American continent. I have myself observed it from Nova Scotia to the extremity of Georgia, a distance of 1,200 miles. It abounds in all the western states and I have learned that it is common in the neighborhood of the great rivers that water upper Louisiana and empty into the Mississippi. But it appeared to be the most multiplied and of the loftiest height between the forty-second and forty-sixth degrees of latitude, which comprise the provinces of Lower Canada, New Brunswick and Nova Scotia, the northeastern section of the United States, and Genesee, in the State of New York.

American lime or basswood (*Tilia americana*)—Among the lime trees of North America, east of the Mississippi this species is the most multiplied. It exists in Canada, but is more common in the northern parts of the United States, where it is usually called basswood. It becomes less frequent toward the South, and in Virginia, the Carolinas and Georgia it is found only on the Allegheny Mountains.

More than a hundred years of settlement has made great inroads upon the continuous forests that once covered the territory embraced within the boundaries of the central hardwood belt. Much of the land within this territory is of great natural fertility, but the settlers found it covered with forests. The first necessity that confronted them was, therefore, besides the securing of sufficient timber for structural, domestic and industrial purposes, to clear a way for the crops. Thus, an enormous quantity, and also enormous in value, if it should be measured by present standards, was consigned to the burning log pile. Later, the remaining forests were drawn upon for the needs of commerce, until now the last strongholds are being attacked.

Ohio, Indiana, southern Michigan and central Illinois, once densely covered with broad-leaved trees, have become agricultural rather than timber sections, although much timber in more or less detached groups still remains. The same is true of western Kentucky and Tennessee and of Missouri. Western New York has been essentially an agricultural section for nearly three-quarters of a century. Pennsylvania, so rich in mineral resources, has drawn upon its woodlands to supply the needs of the mines and furnaces, so that its forests—whether coniferous or broad-leaved—have been cut into in all directions, and agriculture has supplanted the trees through the fertile bottom lands and mountain benches to a greater or less extent throughout the whole territory. The primeval forests are now chiefly confined to certain plateaus of central Kentucky and Tennessee and to the southern Appalachians from Pennsylvania to and into Georgia and Alabama. Even

on these still largely untouched forests some attacks have been made and more or less culling of the better classes of timber, notably of oak suitable for several purposes, poplar, walnut and cherry, has been made.

An enormous area, as shown by a table given on a preceding page, still is unused by agriculture, remaining either in primitive forests, in stump lands or in brush lands. Much of the area still available for forest growth and of little use for any other purposes has been despoiled of all its better trees and is earning little in the way of forest growth that is of value, for tree weeds too often, unless restrained by the art of forestry, succeed the more valuable species. However, there still remains a wonderfully valuable resource of almost or quite untouched forests, while the hope for the future of the country rests in the great areas that, though sadly diminished in value, are still available for forest growth and will doubtless be devoted to that purpose. Coincident with the diminution of the hardwood supply is a growing public appreciation of its value and a greater interest in and knowledge of the methods necessary to perpetuate or reproduce the forests. Wherever there is a tract of land upon which trees of value may once more grow, no matter how barren, unkempt and worthless it may appear to be, there is the possibility of a new forest, which a later generation will be able to devote to the use of a wiser, more conservative, and more appreciative civilization.

THE SOUTHERN CONIFEROUS BELT.

This extremely valuable forest area—which within the last twenty years has been the seat of the most active and extensive development of the lumber industry, only in the last ten years being rivaled in point of growth by the Pacific Coast—as stated before, extends from Delaware along the south Atlantic and Gulf coasts to about the Trinity River in Texas, extending inland various distances, but in rough outline taking in the eastern portions of Virginia, North Carolina and South Carolina, nearly all of Florida, the southern portions of Georgia, Alabama and Mississippi, all of Louisiana, the eastern part of Texas and the southern part of Arkansas. North of this territory the forests are so largely broad-leaved in their species that they are of hardwood rather than of coniferous type.

The chief exceptions to the general coniferous character of this area are found in the extreme southern part of Florida and along the bottom lands of streams flowing into the Gulf, including the wide hardwood

belt bordering the Mississippi River on its lowlands; in these cases, however, possession being often taken by the cypress.

Dr. B. E. Fernow thus describes this forest area, with special reference to the four leading pine species: "There are, in general, four belts of pine forest of different types recognizable, their boundaries running in general direction somewhat parallel to the coast line: (1) The coast plain, or pine-barren flats, within the tidewater region, ten to thirty miles wide, once occupied mainly by the most valuable of southern timbers, the longleaf pine, now being replaced by Cuban and loblolly pines; (2) the rolling pine hills, or pine barrens proper, with a width of fifty to 120 miles, the true home of the longleaf pine, which occupies it almost by itself; (3) the belt of mixed growth of twenty to sixty miles in width, in which the longleaf pine loses its predominance, the shortleaf, the loblolly, and the hardwoods associating and disputing territory with it, and (4) the shortleaf pine belt, where the species predominates on the sandy soils, the longleaf being entirely absent and the loblolly only a feeble competitor, hardwoods being interspersed or occupying the better sites."

In this coniferous belt are seven species of pines; one *Taxodium*, the bald cypress (*Taxodium distichum*); one species of cedar (*Chamaecyparis thyoides*), known as white cedar; three species of juniper; one of the genus *Tumion*, known as stinking cedar, and one yew.

Of these species the most important are the Cuban pine (*Pinus heterophylla*), loblolly pine (*P. taeda*), spruce or cedar pine (*P. glabra*), shortleaf pine (*P. echinata*), longleaf pine (*P. palustris*) and sand pine (*P. clausa*); two species of juniper (*Juniperus virginiana* and *J. barbadensis*), known as red cedars, and bald cypress.

Of all the above named coniferous species, four are of conspicuous value: The longleaf pine, the shortleaf pine, the loblolly pine and the cypress. The Cuban pine (*Pinus heterophylla*) is almost invariably given as one of the four coördinate yellow pines of the South, but its range is so narrow and its quantity so small comparatively, that it is, in fact, a minor wood, owing its chief importance to the fact that in the second growth it often replaces the longleaf.

THE LONGLEAF PINE.

The most valuable of all the southern pines, though perhaps not adapted to the most diversified uses, is the longleaf pine; the famous American pitch pine of foreign trade, or the Georgia pine of domestic commerce up to the time when the more definite term, longleaf pine,

was adopted. This wood was principally confined to a belt about 125 miles in width roughly following the coast from the mouth of Chesapeake Bay to the Trinity River in Texas. The distribution of this wood was continuous from the first-named point to western Mississippi, where the lowlands of the Mississippi River introduced a remarkable break, the species reappearing again in Louisiana and in eastern Texas. The heaviest growth found its northern limit in central North Carolina. In eastern Alabama there was an extension north near the Tennessee line. West of the Mississippi River there were two main bodies, one lying north of the Red River, and the other in western Louisiana and eastern Texas.

The growth of this wood in respect to quality and quantity per acre was remarkably uniform through South Carolina, Georgia and Alabama, but while the immense resources of Georgia and the early prominence of that State in its production and coastwise shipment gave the name "Georgia pine" to the product, the average density, if not the quality of growth, increased toward the west. Thus, the Georgia forests produced higher averages per acre than those of South Carolina, and Alabama forests were denser than those of Georgia or northern Florida; while still heavier were the longleaf forests of Mississippi; and in Mississippi the western portion of the forests, lying west of the Pearl River, were the heaviest. Crossing the Mississippi River, however, the most luxuriant forests of longleaf pine in the country were, and still are, to be found, though perhaps not excelling in this respect some considerable districts in Mississippi. In Mississippi, Louisiana and Texas large tracts have averaged as high as 20,000 feet of merchantable timber per acre.

The longleaf pine is characterized by weight, strength and firmness of grain, and its sap has been the chief basis of the turpentine industry of the Southeast.

In his exhaustive study of the southern pines, entitled, "Timber Pines of the Southern United States," Doctor Charles Mohr thus describes the habitat of the longleaf pine and incidentally gives a clear idea of the other forest characteristics of the region:

This great maritime pine belt east of the Mississippi River presents such differences in topographical features and such diversity of physical and mechanical conditions of the soil as to permit a distinction of three divisions going from the coast to the interior:

1. The coastal plain, or low pine barrens within the tidewater region, extends from the seashore inland for a distance of from ten to thirty miles and over. The

forests of the longleaf pine which occupy the poorly drained grassy flats of the plain are very open, intersected by numerous inlets of the sea and by brackish marshes. They are also interrupted by swamps densely covered with cypress, white cedar, white and red bay, water oak, live oak, magnolia, tupelo gum and black gum, and again by grassy savannas of greater or less extent. On the higher level, or what might be called the first terrace, with its better drained and more loamy soil, the longleaf pine once prevailed, but almost everywhere in the coastal plain the original timber has been removed by man and replaced by the loblolly pine and the Cuban pine.

2. The rolling pine lands, pine hills, or pine barrens proper are the true home of the longleaf pine. On the Atlantic Coast these uplands rise to hills over 600 feet in height, while in the Gulf region they form broad, gentle undulations rarely exceeding an elevation of 300 feet. Thus, spreading out in extensive tablelands, these hills are covered exclusively with the forests of this tree for many hundreds of square miles without interruption. Here it reigns supreme. The monotony of the pine forests on these tablelands is unbroken.

3. The upper division, or region of mixed growth. With the appearance of the strata of the Tertiary formation in the upper part of the pine belt, the pure forests of the longleaf pine are confined to the ridges capped by the drifted sands and pebbles and to the rocky heights of siliceous chert, alternating with open woods of oak (principally post oak), which occupy the richer lands of the calcareous loams and marls. However, where these loams and marls, rich in plant food, mingle with the drifted soils, we find again the longleaf pine, but associated with broad-leaved trees and with the loblolly and shortleaf pine. Here the longleaf pine attains a larger size and the number of trees of maximum growth per acre is found almost double that on the lower division.

Of the distribution of the longleaf pine west of the Mississippi River, Doctor Mohr says:

The forests of the longleaf pine west of the Mississippi River, as in regions so far considered, are geographically limited to the sands and gravels of the latest Tertiary formation. They make their first appearance in Louisiana above the great alluvial plain, in the uplands bordering the valley of the Ouachita, and follow its course for fifty miles; then extend west, skirting Lake Catahoula and the alluvial lands of the Red River. These pine forests to the north of this river cover an area estimated at 1,625,000 acres, extending northward for a distance averaging fifty-five miles. Toward their northern limit the forests pass gradually into a mixed growth of deciduous trees and shortleaf pine. In the center of this region the pine ridges alternate with tracts of white oak and hickory. Tending toward the Red River, the pure forest of longleaf pine which covers the undulating uplands is unbroken. . . . South of the Red River bottom the forests of longleaf pine continue unbroken to the Sabine River and south to the treeless savannas of the coast in Calcasieu Parish, their eastern boundary parallel with the eastern boundary of that parish. Roughly estimated, these forests cover an area of about 2,668,000 acres. . . . On the lands rising gently above the flat woods, with the ridges still low and wide and then more or less imperfectly drained, longleaf pine is found of an exceedingly fine growth. The trees in the dense forest are tall and slender, and

their timber is equaled only by the timber of the same class growing in the valley of the Neches River, in Texas. . . . In Texas the forests of longleaf pine extend from the Sabine west to the Trinity River and from the grassy savannas of the coast region north to the center of Sabine, San Augustine, and Angelina counties, and include an area of about 2,890,000 acres. In amount and quality of the timber these forests are unsurpassed and are only equaled by the forest of the adjoining region in Louisiana. . . . The growth of longleaf pine which covers the gentle, wide swells is dense, of fine proportions and of remarkably rapid development.

The longleaf pine no longer exists in commercial quantities in some sections where it was once abundant. Such is the case in Virginia and most of North Carolina. The lumber industry based upon this timber has also probably reached its maximum in Georgia and Alabama. Yet in all the states south of the Carolinas it will continue for many years to be a tree of first importance economically and in the supply of the markets. Of recent years the greatest developments in the industry have been seen in Florida, Mississippi, Louisiana and Texas, and the largest quantity of standing timber is to be found in the three states last named. Preponderant in quantity of timber, however, is Louisiana, and it promises to maintain an output of longleaf pine which shall be of importance long after the other states have shown marked diminution.

THE SHORLEAF PINE.

Next in importance among the southern pines is the shortleaf pine. This wood is of very wide distribution, reaching far to the north of the limits of the southern coniferous belt. According to F. André Michaux, this species originally extended as far north as Albany, New York, and even to the present time specimens are found on Staten Island. Its northern limit of growth of commercial value is, however, today found in eastern Maryland.

Doctor Charles Mohr thus describes the northern limit, west of the Alleghenies, of shortleaf pine: "A line drawn from the lower part of Wood County, West Virginia, to Menifee County, eastern Kentucky. Beyond the wide gap covered by the deciduous forests of the lower Ohio Valley and the flooded plain of the Mississippi the tree appears on the southeast spur of the Ozark Hills in Cape Girardeau County, Missouri, latitude 37 degrees 30 minutes; and on the opposite side of the river on the bluffs of Union and Jackson counties, Illinois, the line dropping gradually half a degree southward to the westward limit of its range."

It was originally most abundant in Virginia, North Carolina, Georgia, Louisiana, Texas, Arkansas, Indian Territory and Missouri.

For the most part it grew mixed with hardwoods, or the longleaf and loblolly pines, but it made almost pure forests in some limited sections east of the Mississippi River and in northwestern Louisiana, northeastern Texas, southwestern Arkansas and southern Missouri. Notwithstanding the fact that it has largely disappeared from the northeastern part of its range, it still is an important factor in the pine production of all the southern states east of the Mississippi and an especially important one in Louisiana, Arkansas and Texas. The Missouri supplies of this timber are approaching exhaustion and its production in Arkansas cannot long continue at the present rate.

In character the lumber made from the shortleaf pine is lighter and softer than that from the longleaf, and it usually, though not always, bears a similar relation to loblolly. It is often difficult to discriminate among the three varieties of lumber, except when seen in considerable quantities. Individual boards of one species may so resemble characteristic boards of other species as to be almost impossible of identification, but in quantities the shortleaf pine is usually easily recognizable. The wood is especially adapted for house finish, sash and door manufacture, etc.

THE LOBLOLLY PINE.

The third important southern pine is the loblolly, which will probably achieve the distinction of proving in the long run the heaviest contributor of all the southern pines to the lumber supply of the country, inasmuch as it is mixed with all the other pines, reproduces itself readily and ordinarily takes the place of its associates when they are removed by the lumbermen. Its characteristic of abundant fertility and rapid growth has given it the name of "oldfield" pine, inasmuch as it customarily constitutes the second growth timber on cut over pine lands. Loblolly pine extends south over practically the entire range of both longleaf and Cuban pine, and north through the heavier range of shortleaf, except west of the Mississippi River, but finds its northern limit far south of the extreme northern boundary of shortleaf. Its northern limit is found substantially along the northern boundaries of Georgia, Alabama and Mississippi, reaching north on the east to North Carolina and Virginia, and on the west extending a short distance into Tennessee.

West of the Mississippi River it is found in western Louisiana, eastern Texas from the Gulf to Indian Territory, in southeastern Indian Territory and in southern and southeastern Arkansas. It is the leading

pine of Virginia and North Carolina. Its heaviest growth east of the Mississippi River is found through central South Carolina and just south of the center of Georgia, Alabama and Mississippi. Large forests exist in northern Alabama. West of the Mississippi River there are two great bodies, one in eastern Texas and the other in northern Louisiana and southern Arkansas. In almost every case the loblolly grows in mixture with longleaf or shortleaf pine or both and also occupies territories in mixture with hardwoods.

In its lumber characteristics the loblolly is not considered the equal of either longleaf or shortleaf, but its growth is so affected by location that it may in different sections partake of the characteristics of either. In the longleaf district it is usually cut and marketed with the longleaf, and in the shortleaf districts with that wood, seldom, if ever, appearing in the market under its own name. In some sections it grows with a large amount of sap and a small heart, producing lumber even lighter and softer than shortleaf, resembling in this respect northern white pine, while in some other regions it grows heavy and hard, with a marked resemblance to longleaf pine.

The original stand of the yellow pines of the South was enormous. They covered more or less densely a third of Virginia; half of North Carolina; all of South Carolina; nearly all of Georgia; three-fourths of Florida; nearly all of Alabama; three-fourths of Mississippi; two-thirds of Louisiana; a strip in Texas, all the entire length of its eastern boundary reaching from 100 to 125 miles west; half of the Indian Territory; all of Arkansas, except the hardwood limits in the eastern bottoms, and the southern fourth of Missouri, together with scattering examples in Tennessee, Kentucky and West Virginia.

In 1905 the seat of the most extensive manufacture of yellow pine is in Mississippi, Louisiana, Texas and Arkansas, though it is still an important industry everywhere within its range and will continue to be for indefinite years to come. However, while the industry as a whole is increasing in the volume of its production, some sections are showing a decrease. Such are Missouri and portions of Arkansas, and probably within a decade a decided reduction in the annual output of pine from Alabama, Mississippi, Louisiana and Texas will be observed. In the most eastern part of their range the yellow pines have already declined to a basis which can probably be maintained for many years.

Estimates of the quantity of standing timber of the four varieties of yellow pine vary materially; but perhaps an average of the various

estimates of the quantity of timber, so standing that it can be made the basis for pine sawmill operations, is, for the entire South, 300,000,000,000 feet—a quantity which should supply the mills at their present rate of output for about thirty years. But, as the pines cover more or less solidly so wide a range of country, and as their rate of growth is so rapid, there appears no reason why, with conservative management, they should not supply indefinitely a consumption as great as the present. However, only the beginnings of conservative lumbering have yet been made; in fact, the perpetuation of these wonderful resources is only just beginning to be considered by the owners of forests and by lumber producers.

THE SOUTHERN CYPRESS.

The other great conifer of the South, particularly worthy of special mention, is the cypress. Its range is in river swamps and damp lowlands from southern Delaware, near the coast, along the south Atlantic and gulf states into Texas, and north along the Mississippi River and its tributaries as far as southern Illinois and Indiana. In locations favorable as to soil and moisture in all this range, it grows in commercial quantities, but to its highest value on alluvial deposits in the delta regions south of the limit of heavy frosts. As these lands have their greatest area in Louisiana, there the cypress of first quality is found in the greatest abundance on the lands that, before the construction of levees, were subject to overflow; but it is found of similar quality in corresponding locations in Mississippi, Alabama, Florida, Georgia and South Carolina.

OUTLINES OF THE PACIFIC FOREST.

The western grand division of the forest area of the United States will be treated here only in a general way. Somewhat minuter statements as to tree varieties find an appropriate place in the chapter relating to forest reserves, which are almost entirely found in the West, rendering unnecessary a detailed treatment in this place.

The Pacific or western forest includes all the timbered area west of the eastern foothills of the Rocky Mountains, thus including Montana, the western Dakotas, western Nebraska, Colorado, New Mexico and extreme western Texas, and all the states lying west thereof. Various schemes for the subdivision of these forests have been proposed.

A broad one, obvious both because of topography and tree species, makes one dividing line running approximately north and south just east of the Cascade and Sierra Nevada mountains. East of that line,

including the great Rocky Mountain region, the country is arid, or semiarid, with a class of trees adapted to the climate; while west of that line different meteorological conditions prevail and a somewhat distinct flora is to be observed, although there are some species whose botanical and commercial ranges extend over the entire length and breadth of the western forest region. Doctor Sargent makes this grand division, but with further subdivisions.

The extreme southern end of the Rocky Mountain forest introduces a narrow east and west division covering all the southern portions of Arizona, New Mexico and western Texas. This is because in that region the flora is largely of the type of Mexico, with numerous species which are not found elsewhere in the United States and with few that prevail on or north of the mountain masses and elevated plateaus in northern Arizona and New Mexico. Doctor Sargent also turns the main line of the division running east of the Sierras, eastward from Washington to include northern Idaho and northwestern Montana, whence it would extend into British Columbia. This extension, though it would seem to ignore the influence of the Cascade Mountains, agrees with the facts as to the distribution of commercial timber, the coast species at this point extending eastward to Montana with a development which warrants the classification of the timber of western Washington, northern Idaho and western Montana with the coast flora proper rather than with that of the Rocky Mountains.

Doctor Sargent, however, divides the coast forest—that great timbered region extending from the summits of the Cascades and Sierra Nevadas to the coast—by a line following the boundary between Washington and Oregon. From a commercial standpoint that line should be drawn on or just north of the boundary between California and Oregon, for the forests of western Washington and western Oregon are similar in character, and consist chiefly of the same species, while the forest flora of California is somewhat distinct in its character and its species. Thus, the leading commercial species of western Washington, Douglas spruce, hemlock, tideland spruce, giant arborvitæ or red cedar, and various firs, are found in equal development through Oregon, well toward its southern portion; whereas some of the leading species of California, notably redwood and sugar pine, are not found far north of the California border. Redwood, in fact, stops short at the State's boundary, except for a small body in extreme southwestern Oregon. Sugar pine reaches a little farther into Oregon, but decreases in quan-

tity as the line of the Cascades is followed. From a market standpoint, likewise, Washington and Oregon should be grouped, while the forest products of California, including a certain limited portion of southwestern Oregon, find markets of their own.

The Pacific forest is as different from the eastern forest as can well be imagined. It is, in the first place, coniferous in its type. Ignoring the Mexican species at the extreme south, it has nearly sixty species of conifers and only about 105 species of broad-leaved trees, while the eastern forest practically reverses this proportion with only sixty-five species of conifers, while it has about 200 species of broad-leaved trees, in both cases excluding tropical species. In the second place, whereas the eastern forest was originally continuous or practically so, the western forest is much broken, and of the total area included within its limits only a minor portion is tree covered.

A topographical map of the United States clearly shows the cause of these differences. The Rocky Mountain region, lifting itself in multitudes of ranges and high plateaus above the prairie and plains region of the Mississippi Valley and also the interior arid basin of the West, is forested, to such an extent as it is, simply because its average height enables it to squeeze some moisture out of the air, dry as it is, from its passage over the coast ranges on the west or the plains and prairies on the east. The trees of all this great Rocky Mountain region, covering more than six states and territories, are distinctly of mountain type. West of the Rockies is a region of lower and arid mountains, sandy plains and dry and hot valleys, which is practically destitute of forests, the scanty and inferior tree growth being hardly sufficient for the domestic needs of the sparse population.

The determining topographical feature that accounts for this condition is the great Cordillera, which, known as the Cascades through Washington and Oregon and as the Sierra Nevadas through California, acts as an almost impassable barrier, through the greater part of its course, to the warm and moisture laden winds from the Pacific.

Rising abruptly from the shore line, are the Coast ranges of Washington and Oregon. These are broken, so that the parts of those states west of the Cascades are more generally afforested than is the case in California. In that State the Coast ranges are almost continuous, the only important break being at San Francisco Bay. This fact introduces through central California and throughout the south a comparatively dry and treeless region. This continuity of the Coast ranges of Cali-

ifornia and the broken character of the Coast ranges of Oregon and Washington is one of the chief reasons why the east and west dividing line of the Coast arborescent flora should be at about the northern border of California, rather than between Oregon and Washington.

Latitude also has its influence. Stretching from about 32 degrees to 49 degrees north latitude, or nearly 1,200 miles, in the western United States, the treeline rises from north to south so that some trees which cover the whole range are of great commercial value at one extreme and of little value at the other.

Thus, some of the firs, which are found at comparatively low levels in Washington, are at high levels on the Sierra Nevadas. The Douglas spruce or red fir (*Pseudotsuga taxifolia*), which is found at moderate elevations in northern Washington, is found on elevations of 8,000 feet or more in Arizona and New Mexico. Mountain white pine (*Pinus monticola*), which is found at an altitude of 5,000 feet in Idaho, is near the treeline in California, while *Pinus flexilis*, another white pine growing at accessible altitudes near the northern boundary of the United States, is near the treeline in New Mexico and Arizona; further, the Engelmann spruce, at an elevation of 5,000 feet in Idaho, is found in New Mexico at over 8,000 feet.

There are certain species which bind all these somewhat scattered forest areas together. One is the western yellow pine (*Pinus ponderosa*), of which the botanist recognizes two or three varieties. This is the most important timber tree of New Mexico and Arizona, one of the most important of the Sierras and Cascades, is scattered all along the various Rocky Mountain ranges, grows as far east as western Texas and western South Dakota, and is one of the most important contributors to the sawmills of Montana, Idaho and western Washington. The Engelmann spruce is another of these trees of wide distribution. The Douglas fir, which reaches its best development in western Washington and Oregon, is found throughout the entire western forest system, reaching east to the extreme limits of those timbered areas.

On the other hand, some trees are limited in their range. *Pinus flexilis* is characteristic of the Rocky Mountains and *Pinus monticola* of the Coast ranges. Sugar pine is almost exclusively confined to the Sierra Nevadas; tideland spruce, to the immediate vicinity of the northern coast; western hemlock, to the Coast ranges and to northern Idaho; lowland fir, to northern California, Oregon, Washington, Idaho and western Montana; noble fir, to the northern Coast ranges, etc.

The white fir is, by the way, one whose range is practically universal south of central Oregon, Idaho and Wyoming.

The following is a list of the leading commercial timber species of the Pacific forest, with their range and location of best development:

Pinus monticola, silver pine, white pine—Range: From Vancouver Island and southern British Columbia, northern Idaho and Montana, on Cascade and Coast ranges of Washington and Oregon and on Sierra Nevadas, to Calaveras County, California. Best development in northern Idaho.

Pinus lambertiana, sugar pine—Range: From southern Oregon through California, at elevations of 3,000 to 7,000 feet, to San Bernardino Mountains. Best development on western slopes of Sierra Nevadas.

Pinus flexilis, limber pine, Rocky Mountain white pine—Range: Eastern slope of Rocky Mountains from Alberta to western Texas, and in Montana, Nevada, Arizona and southeastern California at elevations of 5,000 to 12,000 feet. Best development in Montana and northern New Mexico and northern Arizona.

Pinus ponderosa, bull pine, western yellow pine—Range: From southern British Columbia and western South Dakota south to western Texas and west to the Pacific Ocean. Very widely distributed, but reaching best development in New Mexico and Arizona and in the northern Sierra Nevadas. Two varieties are included.

Larix occidentalis, western larch or tamarack—Range: Southern British Columbia south between Cascade Mountains and western Montana to northeastern Oregon. Best development northern Montana and northern Idaho.

Picea engelmanni, Engelmann spruce, white spruce—Range: High slopes of Rocky Mountain region west to the Cascade Mountains, from British Columbia to northern Arizona. Best development in extreme north.

Picea sitchensis, Sitka spruce, tideland spruce—Range: Moist soil near coast from Kadiak Island, Alaska, to Mendocino County, California. Most abundant in extreme western Washington.

Tsuga heterophylla, western hemlock—Range: Southeastern Alaska to San Francisco, western slopes of Cascade and Coast ranges, reaching Idaho and western Montana. Best development western Washington and Oregon.

Pseudotsuga taxifolia, Douglas spruce, red fir, Oregon pine—Range: North and south through the Rocky Mountain region and west to the Pacific Coast, except the arid mountains of western Utah and of Nevada. Best development west of the summit of the Cascades in Washington and Oregon.

Abies grandis, lowland fir, white fir—Range: Coast region from Vancouver Island into northern California, east in Washington and northern Oregon to western Montana. Best development in Washington and northern Oregon.

Abies concolor, white fir—Range: Central Oregon south to Mexico, and east over arid regions to Nevada, Utah, Colorado, New Mexico and Arizona. Best development on California Sierras.

Abies amabilis, white fir—Range: Coast and Cascade ranges from British Columbia into northern Oregon. Best development on the Olympic Mountains, Washington.

Abies nobilis, noble fir, red fir, larch—Range: Coast ranges of Washington

and Oregon, on Cascade Range from northern Washington to center of Oregon. Best development on western slopes of Cascades in southern Washington and northern Oregon.

Abies magnifica, red fir—Range: Southern Oregon and south along the western slopes of the Sierra Nevadas. Best development in southern Oregon and northern California.

Sequoia Washingtoniana, bigtree—Range: Western slope of Sierra Nevadas, California, from latitude 36 to 39 north. Best development on the North Fork of the Tule River.

Sequoia sempervirens, redwood—Range: Fringing the coast within the influence of ocean fogs from southern Oregon to Monterey County, California. Best development north of Cape Mendocino.

Libocedrus decurrens, incense cedar—Range: South from Marion County, Oregon, on western slopes of Cascades and Sierra Nevadas through California, and on Coast ranges of California from Mendocino County south; also in western Nevada. Best development on Sierras of central California at elevations of 5,000 to 7,000 feet.

Thuja plicata, giant arborvitae, red cedar, canoe cedar—Range: From coast of southern Alaska south to Mendocino County, California, east in northern Washington and Idaho to northern Montana. Best development in western Washington.

Chamacyparis lawsoniana, Port Orford cedar—Range: Close to Ocean from Coos Bay, Oregon, to the Klamath River, California, also on Siskiyou Mountains and Mt. Shasta. Best development north of Rogue River, Oregon.

Chamacyparis nootkatensis, yellow cedar, Sitka cypress—Range: Cascade Mountains of Washington and northern Oregon west to the coast. Best development in the Olympic Peninsula, Washington, and on coast of Alaska.

Quercus californica, black oak—Range: From central Oregon along western slopes of Sierras through California, and west to Coast ranges. Best development in southwestern Oregon and northern California.

Quercus agrifolia, California live oak—Range: From Mendocino County, California, south through the Coast ranges to Lower California. Best development in valleys south of San Francisco Bay.

Quercus garryana, Pacific post oak, white oak—Range: From British Columbia south through western Washington, Oregon and California. Best development in valleys of western Washington and Oregon.

Acer macrophyllum, Oregon maple, broad-leaved maple—Range: From sea level to 2,000 feet elevations west of the Cascades and Sierra Nevadas to the coast through Washington, Oregon and California. Best development bottom lands of western Oregon.

Arbutus menziesii, madrona—Range: Coast region of Washington and Oregon, and Coast ranges in California. Best development in Mendocino, Humboldt and Del Norte counties, California.

It will be noted that in the above list are twenty species of conifers and but five of broad-leaved trees. The western hardwoods are not of great commercial importance, unless the maple⁹ be excepted, though

⁹ Thomas Nuttall, the English-American botanist, who in 1834 explored the Pacific Coast of the United States, thus speaks of the large leaved maple (*Acer macrophyllum*): "The topographical

important in the domestic economy of the Coast, furnishing fuel, staves, furniture material, house finish, etc.

It is difficult to state what wood is of greatest economic value, but probably that position should be given to Douglas spruce, or Douglas fir, as it has been popularly known. Certainly if with it be combined the various firs, genus *Abies*, such as the lowland, white, noble and red firs, it will excel any other wood in quantity of standing timber and in its contribution to the markets.

Perhaps next in importance is the western yellow pine (*Pinus ponderosa*). This is so, not so much because of its preponderating quantity in any one locality, as because of its wide distribution, entering largely, as it does, into the lumber product of most of the states under consideration. Its product is known as California white pine in California; as Arizona white pine in Arizona; as white pine in eastern Washington, Idaho and Montana. It is the common pine of every day use in many widely separated localities.

After these two timbers come others, rivaling each other in importance, such as western hemlock, whose merits are only yet beginning to be appreciated, redwood, larch and red cedar (*Thuja plicata*). There are other woods of high quality but of restricted range, such as tideland spruce and Port Orford cedar. Then there are the white pines proper (*Pinus monticola* and *Pinus flexilis*), which, though covering a wide range, are seldom found in heavy forests.

FORESTS OF THE WEST, BY STATES.

A brief description of the locations and leading species of the forests of the West, by states, may be of interest.

Washington, west of the center of the State, was originally covered by an almost solid forest. The only important exceptions were the treeless summits of the Cascades and Olympics, some semiprairies in the basin between Puget Sound and the Columbia River, and the sand dunes of the coast. These forests were of remarkable uniformity and wonderful density from the summits of the Cascades westward. To the east the tree growth decreased as the mountains were left behind until in the southeastern part of the State the plains enclosed and drained by

range of this splendid species of maple, wholly indigenous to the northwest coast of America. . . . is a somewhat narrow strip along the coast of the Pacific. . . . The largest trunks of this species we have seen were on the rich alluvial plains of the Willamette, and particularly near to its confluence with the Clackamas; here we saw trees from fifty to ninety feet in height, with a circumference of eight to ten feet. . . . The wood, like that of the sugar maple, exhibits the most beautiful variety in its texture, some of it being undulated or curled; other portions present the numerous concentric spots which constitute the bird's-eye maple. . . . According to London, specimens of the timber which were sent home by Douglas exhibit a grain scarcely inferior in beauty to the finest satinwood."

the Columbia, Snake and lower Yakima rivers are found to be treeless. The northern part of the State throughout its entire width from east to west, was more or less timbered, with valuable forests in the extreme northeast. In the southeast, the forests of the Blue Mountains reach into Washington from Oregon.

Oregon has two principal forest belts. One, following the Coast ranges the entire length of the State, is broken only by some large river valleys; the other follows the line of the Cascade Mountains. These two coalesce in the southern part of the State on the cross ranges, which are there a feature of the topography. East of the summit of the Cascades the timber decreases in quantity and value. The northwestern part of the State is sparsely timbered, but on the mountains, and especially on the Blue Mountains and other ranges in the northeastern part of the State, they are of considerable importance. The central and southeastern interior plain is practically treeless, being a portion of the arid region which extends through Nevada and portions of Utah. The greatest remaining forests of the United States are in Oregon, though nearly equaled by those of California and Washington.

As previously noted, California has two chief mountain systems, one, the Sierra Nevadas, running approximately from northwest to southeast, touching the eastern border of the State at Lake Tahoe where Nevada juts into it, and the other following the coast. The two ranges come together, or are joined by cross ranges, north at about Mt. Shasta, and south by the San Rafael, San Gabriel and other ranges. There is left between these two systems a great valley—that of the Sacramento to the north and of the San Joaquin to the south. This valley is almost treeless. On the Sierras grow sugar pine, western yellow pine and firs of various sorts; and on the Coast ranges, firs, spruces and, close to the coast, the famous redwood. South of the thirty-sixth parallel the forests are not of much commercial importance, but of immense value for local consumption and the protection of watersheds. In the southern and southwestern portions of the State, the forests are unimportant or lacking altogether, and in any event are confined to the mountain slopes.

The forests of the northern part of Idaho are extremely rich, though the rugged topography so breaks them up that in stumpage per acre they will not compare with the forests of western Washington. Here is a notable extension of the coast flora proper, red cedar, Douglas fir and other coast woods growing in profusion, though of smaller size than on the Coast, while there are other timbers of importance, charac-

teristic of the Rocky Mountain region. The southern part of the State is largely arid and treeless, though in the southwestern portions there are some mountain forests of at least local importance.

Nevada is almost treeless. A projection of the Sierra forest is found in the extreme western part of the State, but elsewhere tree growth is confined chiefly to the low ranges of the central and southern part.

Montana is more or less timbered throughout, but the timber of commercial value is chiefly confined to the western and southwestern portion of the State. The main line of the Rockies, running from the state line north of Flathead Lake southwest to the Yellowstone Park, roughly outlines the eastern limits of the forests of commercial value.

Wyoming is a state of rather thin mountain forests, but largely without trees. Only its highest mountain ranges are well timbered. The high tableland which occupies the central part of the State is destitute of tree growth, while the low ridges which rise from this plateau, on the south, carry a scanty open forest. The most valuable trees of Wyoming are yellow pine, Alpine fir, cottonwood, larch, lodgepole pine, etc.

The forests of Colorado are largely confined to the mountain ranges and high valleys of the western part of the State, east of the mountains the surface sloping away into the treeless plains. The most important tree is the Engelmann spruce, mingled with mountain pines. Below the spruce belt come red fir, yellow pine, etc. The Colorado forests have been of extreme value in the development of the State, but are so scattered and thin, and have been so difficult of access, that they have supplied only local requirements.

Utah is largely treeless. Its forests are chiefly in the northeastern and central portions of the State, on the Wasatch Mountains and their continuations to the south. A part of the Colorado forest crosses into Utah in the eastern portion of the State. There are, therefore, two main treeless areas. One in the valley of the Colorado River between the center of the State and the mountains of Colorado; the other occupying the western portion of the State from north to south.

In New Mexico the forests are confined to the slopes and portions of the high mountain ranges. The elevated plateau which forms the eastern part of the State is practically treeless. Extensions to the south of Colorado forests are found in the north, but the chief body of timber is west of the Rio Grande near the central part of the State

north and south. Here the yellow pine forms valuable forests with other woods such as red fir, white pine (*Pinus flexilis*), cypress, etc.

Arizona is almost entirely treeless, except for the central mountain region, which forms an extension of the New Mexico forests northward nearly to the Rio Grande. There is also a little timber in the northeastern part of the State and in the southeastern part on the mountain ranges. The yellow pine here constitutes extensive forests of commercial value.

FOREST RESOURCES OF THE WEST.

Scattered and broken as are the wooded areas embraced within the western states, the Pacific forest represents the greatest remaining timber resource of the United States; and it will continue to increase in relative importance. Remote from the centers of population and of lumber consumption, these forests will constitute the basis of a great lumber industry long after the eastern forest shall have reached the point of slow, conservative utilization on the basis of annual reproduction.

On page 284 will be found a table giving the areas of the various states, an estimate of their wooded areas, and the ratio of those areas to the total areas. From that table we reproduce some of the figures relating to the states within the Pacific forest:

STATES AND TERRITORIES.	Total land area, square miles.	Wooded area, square miles.	Percent of wooded to total area.
Arizona.....	113,738	24,800	21.7
California.....	156,203	44,300	28.3
Colorado.....	103,669	32,900	31.7
Idaho.....	83,371	34,800	41.7
Montana.....	146,240	41,500	28.3
Nevada.....	109,901	6,100	5.5
New Mexico.....	123,545	23,500	19.1
Oregon.....	95,748	53,900	56.3
Utah.....	82,098	10,000	12.1
Washington.....	66,792	48,450	69.3
Wyoming.....	97,552	12,500	12.8
Total.....	1,177,753	330,750	28.1

Standing without comment these figures seem to mean more in some cases and less in others than they actually do. The total area of the eleven states and territories is 1,177,753 square miles, of which 28.1 percent is estimated to be wooded. But the term "wooded area" is an elastic one. It means anything from hardly more than brush lands or a thin growth of inferior trees to the most magnificent forests of the

globe. Thus, the large wooded area of Arizona, or Colorado, or Montana, or New Mexico, means little to the lumber industry, while the figures for California, Oregon and Washington stand for enormous resources. Balancing the estimates in the various states, offsetting worthless lands with those of enormous value, actual or potential, it would not be surprising if the 212,000,000 acres west of the eastern boundary of the Rockies should carry a quantity of timber approaching one thousand billions of feet.

These forests are to remain a great national resource, not only because of their remoteness from the most important lumber consuming sections of the country, but also because they are to be preserved and protected in a large measure by the National government. Over thirty-nine percent of this estimated wooded area was in the latter part of 1905 included within the forest reserves, a somewhat detailed account of which will be given in a succeeding chapter. Much of the more than 83,000,000 acres thus reserved is of scattering timber of little commercial value and set aside for the protection of watersheds and in the hope of an improvement of forest growths; but many large reserved areas, as in Idaho, Washington, Oregon and California, include some of the choicest forests of the continent. Under government control these forest resources will be guarded from fire and theft, and preserved against the day when the lessening supply of timber and the growing demand will render practicable their scientific utilization.

CHAPTER XXVII.

PUBLIC LAND POLICY OF THE UNITED STATES, IN ITS RELATION TO LUMBERING.

By the national domain is meant the entire territory over which the United States exercises sovereignty. The public domain includes that portion of the national domain where the title to the land is, or originally was, vested in the United States. In a general way the public domain and the national domain coincide, except as to the area of the thirteen original states as delimited by their cession to the United States of their western land claims (which will be discussed later). In their present form these states have the following areas:

	Land surface.		Water surface.		Total area.	
	Square miles.	Acres.	Square miles.	Acres.	Square miles.	Acres.
New Hampshire.....	9,056	5,795,840	321	205,440	9,377	6,001,280
Massachusetts.....	8,038	5,144,320	508	325,120	8,546	5,469,440
Rhode Island.....	1,081	691,840	166	106,240	1,247	798,080
Connecticut.....	4,794	3,068,160	818	523,520	5,612	3,591,680
New York.....	47,687	30,519,680	6,032	3,860,480	53,719	34,380,160
New Jersey.....	7,454	4,770,560	719	460,160	8,173	5,230,720
Pennsylvania.....	44,679	28,594,560	1,249	799,360	45,928	29,393,920
Delaware.....	1,969	1,260,160	411	263,040	2,380	1,523,200
Maryland.....	9,875	6,320,000	2,422	1,550,080	12,297	7,870,080
Virginia.....	39,925	25,552,000	2,405	1,539,200	42,330	27,091,200
North Carolina.....	48,972	31,342,080	3,702	2,369,280	52,674	33,711,360
South Carolina.....	30,460	19,494,400	588	376,320	31,048	19,870,720
Georgia.....	58,850	37,664,000	586	375,040	59,436	38,039,040
Total.....	312,840	200,217,800	19,927	12,753,280	332,767	212,970,880

¹ Includes 3,140 square miles lakes Erie and Ontario.

² Includes 691 square miles Lake Erie.

Four of the states afterwards admitted were formed within the uncaded boundaries of the original thirteen colonies—Kentucky, Vermont, Maine and West Virginia. Tennessee was formed from the North Carolina cession, which, however, was subject to existing private claims and to Indian rights, in amount practically equaling the cession. On November 10, 1791, Thomas Jefferson, Secretary of State, reported to Congress that the Indian titles had been extinguished to about 7,500,000 acres, and private claims already reported amounted to 8,118,601½ acres. The rest of the Indian titles were extinguished by treaty,

purchase, or conquest, but the volume of reported claims grew proportionately, and Congress, by act of February 18, 1841, turned both the old claims and the lands over to the State of Tennessee, granting the State any surplus which might be left over after satisfying the claims (Public Domain, p. 83). In the annexation of Texas the State retained the title to its public lands, as explained in a subsequent portion of this chapter, so that in the following states the State, and not the United States, is the owner of the public lands:

	Admitted.	Land surface.		Water surface.		Total areas.	
		Square miles.	Acres.	Square miles.	Acres.	Square miles.	Acres.
Kentucky....	June 1, 1792	39,898	25,534,720	434	277,760	40,332	25,812,480
Vermont....	Mar. 4, 1791	9,114	5,832,960	449	287,360	9,563	6,120,320
Tennessee..	June 1, 1796	41,696	26,679,040	370	236,800	42,066	26,915,840
Maine.....	Mar. 15, 1820	29,894	19,132,160	3,145	2,012,800	33,039	21,144,960
Texas.....	Dec. 29, 1845	262,506	168,003,840	3,505	2,243,200	266,011	170,247,040
W. Virginia.	June 19, 1863	24,343	15,579,520	161	103,040	24,504	15,682,560
Total....		407,441	260,762,240	8,064	5,180,960	415,505	265,923,200

Connecticut, in her deed of cession of western lands, September 13, 1786, excepted the "Western Reserve" of Connecticut in Ohio, extending from the western boundary of Pennsylvania 100 miles westward, and from the forty-first parallel north to Lake Erie. Of this tract, containing about 3,800,000 acres, about 500,000 acres, known as the "fire lands," were donated to its citizens who suffered by fire and raids during the Revolutionary War. Of the balance about 3,000,000 acres were sold to a land company at forty cents an acre, or \$1,200,000, forming the basis of the present Connecticut school fund. Both the jurisdiction and title to these lands were passed to the United States by deed of May 30, 1800, as authorized by the Connecticut Legislature on the second Thursday of May, 1800, and by Congress by act of April 28, 1800. This action was chiefly to confirm title to the land, giving the holders from Connecticut the warrant of United States patents, and this territory was, therefore, practically never a part of the public domain. Other states also made certain specific reservations in their cessions, these being chiefly provisions for military and private land claims which had been issued by the State for the benefit of existing settlements and for extinguishment of Indian titles.

CESSIONS BY THE STATES.

The English colonies were established under royal charters with grants of land in fee simple, though some of the charters were after-

ward forfeited or surrendered and the colonies became royal or crown colonies. The land grants were usually between given parallels of latitude or a given distance north and south from a certain point, bounded on the east, for most of the colonies, by the Atlantic Ocean, with the western boundaries necessarily somewhat vague because of the limited and inaccurate geographical knowledge of the period, but usually covering westward to the "South Sea" or Pacific Ocean, though, of course, practically confined to the western limits of British territory, or the Mississippi River. These charter grants were in most cases the bases of colonial claims to western lands or "back lands," though the claims of New York were based on Indian purchases, and Virginia, in addition to charter titles, claimed a large portion of northwestern territory on the basis of conquest and occupancy based upon the expedition of General George R. Clarke to the Illinois country. The northern and southern extent of the various charter grants often overlapped, causing much confusion.

By proclamation King George III restricted the colonial limits of Virginia, Massachusetts and Connecticut to the eastern watershed of the Allegheny Mountains. By this proclamation of 1763 the western lands were set apart as "Crown lands," following the treaty of Paris in the same year, dividing the territory acquired from France and Spain into four provinces: Quebec, East Florida, West Florida and Grenada. All the lands which were not included within these provinces nor within those granted to the Hudson Bay Company were reserved to the use of the Indians, and the colonies were forbidden to make purchase or settlement without royal permission. The Provincial governors were authorized to issue land warrants in this territory only where they were awarded by the Crown for services in the French and Indian War. Various land companies were formed and secured lands in this territory, but in each instance petitioned direct to the Crown and not to any Colonial government. Among these were the Ohio Company, 1748, which secured 600,000 acres on the Ohio River; The Loyal Company, 1749, which obtained a grant for 800,000 acres of land (Perkins' Western Annals, p. 50); The Greenbrier Company, 1757, which obtained a grant for 100,000 acres. After the treaty of Paris in 1763 a number of other companies secured concessions. Among them were the Walpole Company, 1766, which in 1772 obtained a grant of 2,500,000 acres of land east of the Scioto River between latitudes 38 and 42 degrees north; the North Carolina and Pennsylvania Company, 1775, and the Mississippi Company, 1769.

With the assertion of independence, however, the colonies reëstablished their claims to the western lands according to the provisions of their original charters; and the colonial claims of territory at the beginning of the Revolution covered all the present area of the United States east of the Mississippi River, except the portion of Wisconsin and Michigan in latitude north of the northern boundary of Massachusetts; the territory south of the southern line of Georgia, and a strip west from the present western boundary of Georgia through Alabama and Mississippi. This latter strip was confirmed to the United States by the treaty of peace in 1783, as also the Wisconsin and Michigan territory above referred to. After the treaty Great Britain ceded Florida back to Spain, from whom it had been secured in 1736 in exchange for Cuba, rendering its later purchase by the United States necessary.

At the beginning of the Revolution, therefore, the United States did not own a foot of the land to which the Declaration of Independence applied. However, on September 16, 1776, it granted both commissioned and non-commissioned officers certain bounty lands, the former 150 to 500 acres, according to rank, and the latter 100 acres and \$20 cash. On October 19 of that year, the Maryland convention resolved "That this State ought not to comply with the proposed terms of offering lands to the officers and soldiers, because there are no lands belonging solely and exclusively to this State and the purchase of lands might eventually involve this State in an expense exceeding its abilities, and an engagement by this State to defray the expense of purchasing land according to its number of souls would be unequal and unjust." (Conventions of Maryland, p. 272.)

This was the beginning of the famous "Maryland Controversy," which can be given here only in barest outline. Maryland proposed to substitute in regard to its own soldiers a cash bounty for the land bounty, but the general Government objected and conveyed assurance that the land bounty would be provided by it; and upon this assurance, though the general Government had not then title to a foot of land with which to carry out the promise, Maryland raised its full quota of eight of the eighty-eight battalions of troops called for. Thus was the original objection overcome, but the question as to how the United States was to acquire the land still remained. If it purchased from states having large holdings, like Virginia, these states would thereby be relieved of their proportion of the expenses of the war, and Maryland's soldiers would be attracted from its boundaries to

add not only to the wealth but to the population also of other states, at the expense of its own. In the discussion of the Articles of Confederation on October 2, 1777, a Maryland delegate offered a resolution giving to Congress the power to fix the western boundaries of such states as claimed western lands, and to create new states from the back territory cut off in this way. This was defeated and a counter resolution was adopted adding to the ninth of the Articles of Confederation a provision that "no State shall be deprived of territory for the benefit of the United States." Maryland, however, was not finally defeated and continued the agitation for two years, during which all the other colonies had ratified the Federation. On May 21, 1779, the delegates from Maryland presented the "instructions" of December 18, 1778, in which they were directed not to agree to the federation unless they secured the cession of the western lands. A portion of the argument of this interesting document is well worthy of room here, as it was the turning point in the final establishment of the United States in the possession and control of the public lands:

Suppose, for instance, Virginia indisputably possessed of the extensive and fertile country to which she has set up a claim: what would be the probable consequences to Maryland of such an undisturbed and undisputed possession? They cannot escape the least discerning.

Virginia, by selling on the most moderate terms a small proportion of the lands in question, would draw into her treasury vast sums of money, and, in proportion to the sums arising from such sales, would be enabled to lessen her taxes. Lands cheap and taxes low, compared with the lands and taxes of an adjacent state, would quickly drain the state thus disadvantageously circumstanced of its most useful inhabitants and its wealth; and its consequence in the scale of the confederated states would sink, of course. A claim so injurious to more than one-half, if not to the whole of the United States, ought to be supported by the clearest evidence of the right. Yet what evidences of that right have been produced? What arguments alleged in support of either the evidence or the right? None that we have heard of deserving a serious refutation.

While, however, Maryland stood alone in withholding the ratification of the Articles of Confederation until a definite settlement of the western land question had been secured, it was supported by other states having no western lands, who, however, had not on that basis withheld their ratification. Delaware signed the articles on February 22, 1779, and on the following day presented the following resolutions which had been passed by the Legislature of that State.

Resolved, That this State thinks it necessary, for the peace and safety of the states to be included in the Union, that a moderate extent of limits should be

assigned for such of those states as claim to the Mississippi or South Sea; and that the United States in Congress assembled, should, and ought to have the power of fixing their western limits.

Resolved, That this State consider themselves justly entitled to a right, in common with the members of the Union, to that extensive tract of country which lies westward of the frontiers of the United States, the property of which was not vested in, or granted to, individuals at the commencement of the present war:—that the same hath been, or may be, gained from the King of Great Britain, or the native Indians, by the blood and treasure of all, and ought therefore to be a common estate, to be granted out on terms beneficial to the United States.

New Jersey also, in ratifying the Articles of Confederation in 1778, called attention to this matter and supported the position of Maryland, but left it to the candor and justice of the several states for future adjustment. Virginia and some other states claiming western lands, however, opened land offices and otherwise began to dispose of the lands, which led Congress, on October 30, 1779, by a vote of eight states to three, to pass a resolution declaring "the appropriation of vacant lands during the continuance of the war to be attended with great mischiefs," and requesting Virginia to "reconsider their late act of assembly for opening their land office."

Public sentiment was, meanwhile, growing to a due appreciation of the value and importance to the Nation of the western lands, and of the difficulties involved in their remaining under state ownership, particularly under the various conflicting claims. New York in the next year led in their cession by the various states, by authorizing its delegates in Congress to act in behalf of the State in restricting its western boundaries, the ceded lands to remain within the jurisdiction of the State, but the title to be in Congress for the benefit of all the states. Congress, by resolution of October 10, 1780, recommended such action to the other western land states, reminding them "How indispensably necessary it is to establish the Federal Union on a fixed and permanent basis, and on principles acceptable to all its respective members; how essential to public credit and confidence, to the support of our army, to the vigor of our councils, and success of our measures; to our tranquillity at home, our reputation abroad, to our very existence as a free, sovereign, and independent people; that they are fully persuaded the wisdom of the respective legislatures will lead them to a full and impartial consideration of a subject so interesting to the United States, and so necessary to the happy establishment of the Federal Union."

At this time, also, before any public lands had been acquired, was

laid the foundation of a public land policy in the following resolution, adopted October 10, 1780:

Resolved, That the unappropriated lands that may be ceded or relinquished to the United States, by any particular state, pursuant to the recommendation of Congress of the sixth day of September last, shall be disposed of for the common benefit of the United States, and be settled and formed into distinct republican states, which shall become members of the Federal Union, and have the same rights of sovereignty, freedom, and independence, as the other States; that each State which shall be so formed shall contain a suitable extent of territory, not less than 100 nor more than 150 miles square, or as near thereto as circumstances will admit; that the necessary and reasonable expenses which any particular State shall have incurred since the commencement of the present war, in subduing any British posts, or in maintaining forts or garrisons within and for the defence, or in acquiring any part of the territory that may be ceded or relinquished to the United States, shall be reimbursed.

That the said lands shall be granted or settled at such times, and under such regulations, as shall hereafter be agreed on by the United States, in Congress assembled, or any nine or more of them.

On this day, also, Connecticut tendered a cession of her claims, which was not accepted because of objectionable restrictions as to jurisdiction. This left New York the opportunity to be first in the cession of such claims. Meanwhile, however, the Virginia Legislature, on January 2, 1781, by act offered a cession of western lands upon terms which were unacceptable to Congress, and on March 1 of that year the Maryland delegates signed the Articles of Confederation, being assured of the final satisfactory settlement of the matter, and not being willing longer to give hope to Great Britain through her refusal. On the same day the New York delegates in Congress made a formal offer of her western lands. It was not until October 29 of the following year that this cession, under motion by a delegate from Maryland, was accepted by Congress, Virginia and Massachusetts voting in the negative. Other cessions followed in the following order:

New York—The cession as above noted was for title to land held under treaties with the Six Nations of Indians, of indefinite extent from the source of the Great Lakes southward across the Ohio Valley as far as the Cumberland Mountains. There was no crown or royal charter except for the small portion west of New York, now a part of Pennsylvania, containing 315.91 square miles, sold by the United States to Pennsylvania in 1792 for seventy-five cents an acre. This New York claim overlapped those of Massachusetts and Virginia.

Virginia—On October 20, 1783, Virginia empowered her delegates

to make a cession of her claims, consummated by deed of March 1, 1784. This was to land north of the Ohio River, overlapping completely the claims of Connecticut and Massachusetts, based upon charters and upon conquest through the Clarke exploration. She retained the territory embraced in the present states of West Virginia and Kentucky. To latitude 41 degrees the claim was by charter, and north of that by conquest.

Massachusetts—On April 19, 1785, Massachusetts ceded her claims to 54,000 square miles of back lands, in what is now southern Michigan and Wisconsin, being the westward extension of the boundaries of her charter grant.

Connecticut—On September 13, 1786, Connecticut made the cession of western lands claimed by her, in extent 40,000 square miles, lying in a narrow strip extending westward from Pennsylvania through the northern parts of the present states of Ohio, Indiana and Illinois to the Mississippi River.

South Carolina—South Carolina was next, August 9, 1787, with the grant of 4,900 square miles extending directly westward from the present western boundary of the State.

North Carolina—On February 25, 1790, North Carolina ceded her western lands, 45,000 square miles, coincident with the present State of Tennessee. This grant was conditional upon the settlement by the United States of private claims, which were found to consume all the public land within the cession, so that Tennessee is only nominally reckoned among the public land states.

Georgia—This State was last, on April 24, 1802, with the cession of her western lands, estimated at 88,578 square miles. This cession was delayed by a dispute over what are known as the "Yazoo land claims," further reference to which is made upon page 351.

The following table gives a summary of these state cessions:³

³ Donaldson (Public Domain, p. 11) is authority for the areas here given, no later figures being available. Adding the total above given to the latest survey figures (including water surface) of the original thirteen states and of Kentucky, Vermont, Maine and West Virginia, which were formed from their original areas, 440,205 square miles, gives a total area of 799,580.91 square miles. As the latest authorities give the area of the United States in 1800 at 827,544 square miles (see O. P. Austin in "Summary of Commerce and Finance" for May, 1905, p. 4299), this leaves 28,283.09 square miles of national domain unaccounted for in the above figures. Donaldson appears to include in the area of the Virginia cession the northern part of Michigan and Wisconsin, and of Minnesota east of the Mississippi River, confirmed to the United States by Great Britain in the treaty of 1783, and in the Georgia cession the strip in the southern part of Alabama and Mississippi confirmed in the same manner, so that the area of these cessions added to the area of the states noted should equal the entire national domain at that time. It is probable that the figure quoted for total area of the United States in 1800 includes areas of the Great Lakes, while these were excluded in computing the areas of the cessions; which, with discrepancies in survey figures would account for the difference.

STATES.	Date.	Square miles.	Acres.
Massachusetts } Cessions disputed {	Apr. 19, 1785	54,000	34,560,000
Connecticut	Sept. 13, 1786	40,000	25,600,000
New York—actual ⁴	Mar. 1, 1781	315.91	202,187
Virginia—exclusive of Kentucky	Mar. 1, 1784	265,562	169,959,680
South Carolina	Aug. 9, 1787	4,900	3,136,000
North Carolina	Feb. 25, 1790	45,600	29,184,000
Georgia	Apr. 24, 1802	88,578	56,689,920
Total cession		404,955.91	259,171,787

Thus was laid the foundation of the public domain and the United States became a land owner over a large portion of its original area.⁵ The public domain was afterwards largely added to by subsequent annexations, almost the entire area of which was added to the public domain as well as to the national domain. The following is a table of these additions:

AREA ADDED.

TERRITORIAL DIVISION.	Year.	National domain, square miles.	Public domain, square miles.	Cost.
Louisiana purchase	1803	875,025	875,025	\$30,295,463.15
Florida purchase	1819	70,107	70,107	6,489,768.00
Annexation of Texas	1845	389,795	.....	.....
Oregon territory ⁶	1846	288,689	288,689	.....
Mexican cession	1848	523,802	523,802	\$18,250,000.00
Purchase from Texas	1850	.....	123,784	\$16,000,000.00
Gadsden purchase	1853	36,211	36,211	10,000,000.00
Alaska purchase	1867	589,446	589,446	7,200,000.00
Total		2,783,075	2,517,064	\$88,235,231.15

⁴ New York's claims under Indian treaties were inchoate and located in the same territory claimed by Virginia and partly by Massachusetts and Connecticut, and the above included area is only the small triangular tract lying west of New York State, which was afterward purchased from the United States by Pennsylvania. The Massachusetts and Connecticut cessions are not included in the above total because included in the area of the Virginia cession.

⁵ The total area of the United States in 1800 was 837,844 square miles, so that the public domain after the Georgia cession (including Tennessee) was 48.9 percent of the total area.

⁶ This is usually given at \$15,000,000, the original purchase price. Donaldson (Public Domain, p. 105) gives the cost to June 30, 1800, as follows: Principal sum, \$15,000,000; interest to redemption, \$8,529,353; claims of citizens of the United States due from France, under this treaty assumed by the United States in part payment for the territory and paid to June 30, 1880, \$3,738,268.98; total, \$27,267,621.98; to which must be added "French spoliation claims" paid from June 30, 1880, to June 30, 1904, others of which are still in process of adjustment (compiled from treasury reports), \$3,027,841.17, making the total given of \$30,295,463.15.

⁷ Includes interest.

⁸ By some authorities the Oregon territory is included in the Louisiana purchase, but Government officials now prefer to rest the title upon the treaty with Great Britain. (See O. P. Austin of the Department of State, in Encyclopedia Americana under "United States, Territorial Expansion of the"; and "Territorial and Commercial Expansion of the United States, 1800-1903," p. 4299, in "Summary of Commerce and Finance" for May, 1904, Bureau of Statistics, U. S. Department of Commerce and Labor.) "The northwest boundary [of the Louisiana purchase] was also somewhat vague and uncertain, and would be open to controversy with Great Britain. [That] the territory extended west to the Rocky Mountains was not questioned, but it might be claimed that it extended to the Pacific. An impression that it did so extend has since

Donaldson (*Public Domain*, p. 18) also includes in a similar table the Georgia cession of 88,578 square miles or 56,689,920 acres, at a cost of \$6,200,000, the amount eventually paid in settlement of what are known as the "Yazoo scrip claims," although the deed of cession provided that Georgia was to receive \$1,250,000 "out of the first net proceeds of lands lying in said ceded territory."¹¹ The inclusion of this item brings the entire cost of purchases to \$94,435,231.15.

For the sake of completeness the following table of segregated additions may be added, though they will hereafter be ignored as additions to the public domain:

TERRITORIAL DIVISION.	Year.	Area, square miles.	Purchase price.
Hawaiian Islands.....	1897	6,740	.....
Porto Rico.....	1898	3,600	.....
Guam.....	1898	175	.....
Philippine Islands.....	1899	143,000	\$20,000,000
Samoa Islands.....	1899	73	.....
Additional Philippines.....	1901	68	100,000
Total.....		153,656	\$20,100,000

prevailed in some quarters, and in some public papers and documents it has been assumed as an undoubted fact. But neither Mr. Jefferson nor the French, whose right he purchased, ever claimed for Louisiana any such extent, and our title to Oregon has been safely deduced from other sources. Mr. Jefferson said expressly: "To the waters of the Pacific we can found no claim in right of Louisiana."—Judge T. M. Cooley, "The Acquisition of Louisiana" (*Indiana Hist. Soc. Pamphlets*, No. 3). "The claim to the territory beyond [the Rocky Mountains] was based upon the principle of continuity, the prolongation of the territory to the adjacent great body of water. As against Great Britain, the claim was founded on the treaty of 1763, between France and Great Britain, by which the latter power ceded to the former all its rights west of the Mississippi River. The United States succeeded to all the rights of France. Besides this, there was an independent claim created by the discovery of the Columbia River by Gray, in 1792, and its exploration by Lewis and Clark. All this was added to by the cession by Spain, in 1819, of any title that it had to all territory north of the forty-second degree."—Rt. Rev. C. F. Robertson, "The Louisiana Purchase" (*Papers of the Am. Hist. Assn.*, v. 1, p. 259). While the latter writer sets up one claim by inheritance through the Louisiana Purchase, it will be noted that various other factors are also relied upon to support the title.

⁹ Donaldson (*Public Domain*, p. 18) gives this at \$15,000,000. The "Summary of Commerce and Finance" for May, 1904, (Supplement on "Territorial and Commercial Expansion of the United States, 1800-1903"), gives the above total, with the statement that \$3,250,000 of this sum was in payment of claims of American citizens against Mexico.

¹⁰ Some authorities give this at \$10,000,000, the original purchase price, which was to have been paid (*Public Domain*, p. 135) in fourteen-year five percent bonds. The original act of September 9, 1850, however, (U. S. Stat. 9, 447) contained the following provision: "Provided, also, that not more than \$5,000,000 of said stock shall be issued until the creditors of the State holding bonds and other certificates of stock of Texas for which duties on imports were specially pledged, shall first file at the treasury of the United States releases of all claims against the United States for or on account of said bonds or certificates, in such form as shall be prescribed by the Secretary of the Treasury and approved by the President of the United States." By act of February 28, 1855 (U. S. Stat. 10, 617), Congress further provided that in lieu of the \$5,000,000 in five percent stock which had been withheld under the previous act the Secretary of the Treasury be authorized to pay such creditors of the late Republic of Texas as were reported to be under the provisions of the aforesaid act by the "report of the late Secretary of the Treasury to the President of the United States, and approved by him on the thirteenth day of September, 1851." The act further provided that the sum of \$7,750,000 be divided pro rata among said creditors. Donaldson (*Public Domain*, p. 135), states that the sum distributed under this act was \$7,500,000, which, with the original issue of bonds and the interest of \$3,500,000 upon them, makes up the total given of \$16,000,000.

¹¹ J. W. Monette, "Discovery and Settlement of the Valley of the Mississippi," bk. 5, ch. 13 (v. 2).

ACRE COST OF PURCHASES.

The following shows the cost per acre of the additions to the public domain secured through purchase, based upon the foregoing tables :

TERRITORIAL DIVISION.	Total area.		Total cost.	Cost per acre.
	Square miles.	Acres.		
Louisiana purchase.....	875,025	560,016,000	\$30,295,463.15	\$0.0549
Florida purchase.....	70,107	44,868,480	6,489,768.00	.1448
Mexican cession.....	523,802	335,233,280	18,250,000.00	.0547
Purchase from Texas.....	123,784	79,221,760	18,000,000.00	.2019
Gadsden purchase.....	36,211	23,175,040	10,000,000.00	.4315
Alaska purchase.....	569,446	363,645,440	7,200,000.00	.0188
Georgia cession.....	88,578	56,689,920	6,200,000.00	.1084
Total.....	2,316,953	1,482,849,920	\$94,435,231.15	

Average cost per acre for total purchases, 6.36 cents.

As a matter of curiosity it may be noted for comparison with this showing that the purchase of the Philippines, 91,520,000 acres at \$20,000,000, cost 21.85 cents an acre, and the small additional purchase overlooked in the original treaty, cost \$2.1043 an acre. If to this be added the cost of conquest of the islands after purchase it will be seen that modern American diplomacy suffers by comparison with that which secured the early expansion of American territory, though, in respect to the Philippines, it may properly be noted that the price paid to Spain was no ordinary purchase, but was the result of the effort of a victorious and rich nation to establish a just and lasting peace, based on a restoration of friendly relations.

PRIVATE LAND CLAIMS.

The cost of settling claims has been included in the cost of two of the purchases, as will be noted. There is, however, another item which enters largely into the cost, not only of the purchases but of lands secured by cession or conquest. This consists of private claims to lands under the previous governments from which the titles were acquired. In these transfers the United States has always recognized vested property rights, whether complete and perfected or still incomplete. Various states made certain reservations in their cessions, some of which have been noted; and in one case, that of North Carolina, the liabilities which the United States assumed in connection with the cession were such as eventually to consume all the public land comprised therein.

In the acquisitions which were at one time or another formerly under Spanish domination private grants were especially numerous and liberal. The land department has issued various maps upon which the old

Spanish grants which so far have been confirmed are located; but no statement of their aggregate is available.¹²

COST AND RETURNS OF THE PUBLIC DOMAIN TO DATE.

Thomas Donaldson (Public Domain, pp. 17-21 and 523-524), gives some interesting detailed statements as to the receipts and the cost of the public domain to June 30, 1883, which may be summarized briefly as follows:

RECEIPTS PRIOR TO JUNE 30, 1796.

1787, sold at New York, 72,974 acres (cash).....	\$117,108.24
1796, sold at Pittsburg, 43,446 acres (certificates and land warrants).....	100,427.53
1792, to the State of Pennsylvania, 202,187 acres (certificates of public debt).....	151,640.25
1792, to John Cleves Symmes, 272,540 acres (army land warrants).....	189,693.00
1792, to Ohio Company, 892,000 acres (certificates and army land warrants).....	642,856.66
Total, 1,484,047 acres.....	\$ 1,201,725.68
Gross receipts from June 30, 1796, to June 30, 1883.....	232,376,135.36
Total gross receipts.....	\$233,576,861.04
Deduct amount paid to the several states under the 2, 3 and 5 per cent fund acts, to June 30, 1882, when last adjusted.....	\$7,333,069.76
Deduct cash paid the several states and territories under the distribution act of September 4, 1841.....	691,117.05
Net receipts by the United States from the public lands to June 30, 1883.....	8,024,186.81
	\$225,552,675.23

COST OF THE PUBLIC DOMAIN.

Purchase price under treaty stipulations.....	\$ 88,157,389.98
Surveys cost to June 30, 1880, estimated (including salaries of clerks and expenses of surveyors-general).....	24,468,691.00
General and local land office expenses to June 30, 1880, partly estimated.....	22,094,611.07
Survey and Land Office expenses for three years to June 30, 1883.....	8,484,437.03
Expenses of Indian department to June 30, 1883, on account of holding treaties, etc., and including yearly payments for annuities and other charges, which are, in fact, in consideration for surrender of occupancy title of lands to the Government.....	208,776,031.24
Total cost.....	\$351,981,160.32
Deduct total receipts.....	225,552,675.23
Leaves present cost.....	\$126,428,484.89

The purchase price as here given by Donaldson should be corrected by the addition of \$3,250,000, claims of American citizens against Mexico assumed by this country in connection with the Mexican cession, by the treaty of Guadalupe Hidalgo. This item, as already stated, Mr. Donaldson appears to have overlooked. In order to bring the cost of

¹² As an illustration it may be stated that in New Mexico, with a land area of 78,428,000 acres, the state map issued by the General Land Office in 1896 showed claims whose area is estimated approximately as follows: Confirmed, about 365 townships; confirmed, requiring new boundaries, about 62 townships; total, about 427 townships, or 15,372 square miles, or 9,838,080 acres; unconfirmed, about 49 townships, or 1,764 square miles, or 1,128,960 acres.

William E. Curtis, in *The Chicago Record Herald* of August 5, 1906, quotes Governor Otero, of New Mexico, as authority for the statement that the United States Court of Private Land Claims, created by act of Congress in 1891, and which went out of existence on June 15, 1894, confirmed the title to about 7,300,000 acres out of claims aggregating over 40,000,000 acres in that Territory.

the Louisiana Purchase down to June 30, 1904, the French spoliation claims¹³ paid during the fiscal years ended June 30, 1891, to June 30, 1904, \$3,027,841.17, must also be added, making the aggregate present cost of purchases \$94,435,231.15. This does not include the expenses of making the several treaties under which territory was acquired, nor of commissions to adjust boundaries. A list of these is given in Senate Ex. Doc. No. 88, second session, Forty-fourth Congress. If it were possible to do so the extent of private land claims antedating acquisition of territory and finally confirmed should be taken into consideration, either in reducing the area of acquired territory or in enhancing the cost. These have been variously settled, either by allowing the claims for land in place, or issuing lieu scrip giving privilege of selecting other lands, or by cash payment; and have been so inextricably confused with private land claims of origin subsequent to acquisition of the territory that no statement of even approximate accuracy could be compiled without an amount of labor and research not warranted in a work the purpose of which is along another line.

COST AND RECEIPTS OF PUBLIC DOMAIN, 1884 TO 1904 INCLUSIVE.

An attempt has been made to bring Donaldson's figures down to date, although the task is one of considerable difficulty owing to the manner in which Government reports are made up, as will hereafter be explained in connection with the showing of cost. In regard to receipts there was little difficulty in making up from the annual reports of the Commissioner of the General Land Office the table which is here given:

¹³ The claims of \$3,789,988.98 included by Donaldson in the cost of the Louisiana Purchase were claims of citizens of the United States due from France and specifically assumed under the treaty of purchase, which limited the amount of claims so assumed to \$3,750,000. The French "spoliation claims" whose payment by the United States began in 1890-1, have a different identity. In the convention with France of 1900 "a distinction, which was finally embodied in the treaty, was drawn by the French government between two classes of claims: First, debts due from the French government to American citizens for supplies furnished, or prizes whose restoration had been decreed by the courts; and, secondly, indemnities for prizes alleged to have been wrongfully condemned. The treaty provided that the first class, known as debts, should be paid, but excluded the second or indemnity class. . . . Upon this basis the convention was finally ratified. . . . The United States, therefore, having received a consideration for its refusal to prosecute the claims of its citizens, thereby took the place, with respect to the claimants, of the French government, and virtually assumed the obligations of the latter. . . . The claims for indemnity thus devolving upon the United States, known as the French spoliation claims have been from that day to this the subject of frequent report and discussion in Congress, but with no result until the passage of the act of January 20, 1885, referring them to the Court of Claims. At the present time (1888) they are undergoing judicial examination before that tribunal."—J. R. Soley, "The Wars of the United States 1789-1859," (Narrative and Critical Hist. of Am., v. 7, ch. 6; and editor's footnote.) These are the claims upon which payments run from 1890 to the last report at hand, for June 30, 1904, and whose payment is probably therefore still incomplete. "Spoliations committed by the French in the Revolutionary and Napoleonic wars subsequent to the year 1800 were indemnified under the provisions of the treaty for the Louisiana Purchase, under the treaty with Spain in 1819, and under a later treaty with France which was negotiated in Andrew Jackson's most imperative manner in 1831. These do not enter into what have become historically specialized as the French spoliation claims."—Larned, "History for Ready Reference and Topical Reading," p. 3439.

Land sales and fees.....	\$127,171,951.96	Government property sales..	\$ 25,298.98
Indian sales.....	10,722,423.97	Transcript fees.....	227,580.45
Timber depredations.....	474,158.76		
Timber sales ¹⁴	164,768.37	Total receipts.....	\$138,786,174.34

In regard to the expenses of survey, administration and disposition much difficulty is experienced in making an accurate showing, owing to the fact that the annual land office reports do not make a complete showing. The expenses of local land offices are set forth, but there are no assembled details as to the salaries and other expenses of general land office, expenses of surveying public lands, etc. The annual reports for 1901 to 1904 do give, without analysis, the following sums as representing the total cost of the land service for the respective years, including both payments and liabilities:

1901.....	\$1,813,719.12
1902.....	1,881,583.40
1903.....	1,925,624.16
1904.....	2,100,093.92

Two or three of the older annual reports, after the total of disbursements of the accounting division, say, "To which may be added salaries of the General Land Office," giving the amount. Owing to the unanalyzed condition of the items shown in these statements, however, it was found necessary to go to the annual Finance Reports (Reports of the Secretary of the Treasury), which annually publish a table of net disbursements by warrants. From these tables the following figures were compiled:

Public land offices.....	\$14,067,015.84	Distribution of proceeds, ¹⁷	
Contingent expenses public		1885.....	\$ 10,461.89
land offices.....	3,115,027.52	Classification of certain min-	
Surveying public lands.....	¹⁵ 5,586,939.86	eral lands in Montana and	
Repayment for wrongly sold...	1,300,387.23	Idaho, 1898-1901.....	113,444.85
Depredations public timber...	¹⁶ 727,294.43	Payment to Des Moines River	
Protecting public lands.....	2,442,964.39	settlers, ¹⁸ 1897, 1901 and	
Protecting forest reserves.....	1,543,125.72	1902.....	359,392.76
Surveying forest reserves.....	945,345.50	Total.....	\$30,211,379.99

An inspection of these figures will show the necessity for further rearrangement in order to make the proper showing as to expenses and receipts from the public domain. The receipts from sales of Indian lands are trust funds, whose disbursements are not shown in the expen-

¹⁴ These timber sales were under the acts of March 3, 1891, and June 4, 1897.

¹⁵ This amount includes surveys Indian Territory, 1897-8, \$327,346.39; resurvey Chickasaw lands, 1898-9, \$141,500, and surveys in land grants, 1898-9, \$69,270.59.

¹⁶ In later years, after 1893, this expenditure appears to be consolidated with that represented in the following item, the title of which was thereafter changed to "Protecting public lands, timber, etc."

¹⁷ This seems to have been the last payment under the distribution act of September 4, 1841. (See page 358 and footnote, page 354; also page 373.)

¹⁸ Certain public lands were in 1846 granted the State of Iowa for the improvement of the Des Moines River. The above payments were indemnities to settlers occupying these lands at the time of the grants.

ditures, and they should, therefore, be ignored. Sales of timber and amounts received on account of timber depredations may properly be included among the receipts from the public domain; but the sales of Government property (old office furniture and the like) and the receipts for transcripts should be deducted from the expenditures. From the receipts, in turn, should be deducted the repayments for lands wrongly sold; distribution of proceeds (the single item in the year 1885), and also the payments to states under the 2, 3, and 5 percent fund acts, and cash swamp land indemnity claims paid, these two items not being included in the table of expenditures. This will produce the following showing:

FINANCIAL STATEMENT, 1884-1904 INCLUSIVE.

	Receipts.	Disbursements.
Receipts from land sales and fees.....	\$127,171,951.96	
Receipts from timber depredations.....	474,155.76	
Receipts from timber sales.....	164,768.27	
Total gross receipts.....	\$127,810,870.99	
Less repayment for lands wrongly sold.....	\$1,800,367.23	
Less distribution of proceeds.....	10,461.89	
Less 2, 3 and 5 percent funds ¹⁹	5,267,066.45	6,577,895.57
Leaves net receipts.....	\$121,232,975.42	
Cost of public land offices.....		\$14,067,015.84
Contingent expenses of same.....		3,115,027.52
Cost of surveying public and other lands.....		5,686,839.86
Surveying forest reserves.....		945,345.50
Depredations on public timber.....		727,394.43
Protecting public lands and timber.....		2,442,964.39
Protecting forest reserves.....		1,543,125.73
Classification of certain mineral lands in Montana and Idaho.....		13,444.85
Payment to Des Moines River settlers.....		359,292.76
Total gross expenses.....		\$28,900,450.87
Less Government property sales.....	\$ 25,298.93	
Less transcript fees.....	237,580.45	
	\$ 252,879.38	252,879.38
Leaves net expenses.....		\$28,647,571.49
Deduct from receipts.....	28,647,571.49	
Leaves net returns of.....	\$ 92,585,403.93	

It will be noted that Donaldson includes the expenses of the Indian department in the cost of the public domain, on the theory that the care of the Indians is an equivalent for their surrender of occupancy of the land of the United States. It might, perhaps, be argued that this care of dependent wards of the nation would have been exercised in any event. However, the reader may include this item or eliminate it, as he chooses. There has been paid out in this connection to June 30, 1904, \$412,677,393.55, and to June 30, 1883, \$208,776,031.24, the differ-

¹⁹ This item was secured by subtracting from the totals paid the several states to June 30, 1904, \$12,800,136.21 (Land Office Report 1904, p. 218) the totals paid under this head to June 30, 1883, \$7,333,069.76 (Public Domain, p. 523).

ence between these sums, or \$203,901,362.31, representing the cost for the later period. This sum is sufficiently large to swallow up the entire net returns from the land service and leave a deficit of \$111,325,958.38, accruing in the years 1884-1904 inclusive, to be added to that shown by Mr. Donaldson's figures (as corrected).

Against this Donaldson offsets the cost of the Indian department, which to June 30, 1904, as already stated, amounted to \$412,677,393.55. This would make the present cost of the public domain remaining in the possession of the United States, above all returns therefrom, \$145,740,111.18.

PRESENT AREA OF THE PUBLIC DOMAIN.

The following table of public land states (exclusive of Tennessee) shows the total public domain (exclusive of island possessions) unappropriated, reserved and appropriated, to June 30, 1904:²⁰

UNAPPROPRIATED, RESERVED AND APPROPRIATED LANDS IN THE PUBLIC LAND STATES AND TERRITORIES.

STATE OR TERRITORY.	Area unappropriated and unreserved.			Area reserved.
	Surveyed.	Unsurveyed.	Total.	
Alabama.....	219,730		219,730	51,480
Alaska.....		²¹ 368,035,975	368,035,975	²² 67,705
Arizona.....	12,064,793	34,936,800	47,001,593	20,249,180
Arkansas.....	2,427,587		2,427,587	2,560
California.....	28,077,190	7,136,603	35,213,793	20,818,779
Colorado.....	31,733,053	4,098,543	35,831,596	5,294,348
Florida.....	997,777	160,070	1,157,847	19,259
Idaho.....	10,848,849	28,819,787	39,668,636	2,061,577
Illinois.....				
Indiana.....				
Indian Territory.....				19,714,560
Iowa.....				
Kansas.....	947,642		947,642	120,375
Louisiana.....	102,173	65,018	167,191	1,468,434
Michigan.....	340,507		340,507	120,654
Minnesota.....	2,243,210	884,198	3,127,408	2,346,820
Mississippi.....	92,420		92,420	
Missouri.....	191,681		191,681	
Montana.....	18,409,023	38,046,412	56,455,435	18,616,446
Nebraska.....	7,822,789	11,974	7,834,763	628,855
Nevada.....	30,833,050	30,417,530	61,250,580	5,983,409
New Mexico.....	38,123,606	14,128,734	52,252,340	7,358,104
North Dakota.....	7,795,095	3,302,356	11,097,451	2,686,670
Ohio.....				
Oklahoma.....	2,095,427		2,095,427	3,055,469
Oregon.....	14,527,289	5,846,965	20,374,254	14,894,937
South Dakota.....	10,413,471	306,831	10,720,302	12,225,989
Utah.....	11,560,475	28,142,991	39,703,466	7,750,479
Washington.....	4,008,954	4,853,978	8,862,932	11,395,331
Wisconsin.....	71,373		71,373	432,524
Wyoming.....	34,320,326	2,609,852	36,930,178	15,511,085
Grand total.....	270,267,760	571,604,617	841,872,377	172,873,079

²⁰ From page 130 of the report for 1904, Commissioner of General Land Office.

²¹ The unreserved lands in Alaska are mostly unsurveyed and unappropriated.

²² So far as estimated.

UNAPPROPRIATED, RESERVED AND APPROPRIATED LANDS IN THE PUBLIC LAND STATES AND TERRITORIES—Continued.

STATE OR TERRITORY.	Area appropriated.	Total area in State or Territory.		
		Land surface.	Water surface.	Total area.
Alabama.....	32,386,710	32,657,920	465,920	33,123,840
Alaska.....		368,103,680	15,541,760	383,645,440
Arizona.....	5,541,547	72,792,320	84,480	72,876,800
Arkansas.....	31,113,263	33,543,680	522,240	34,065,920
California.....	43,937,338	99,909,920	1,299,200	101,269,120
Colorado.....	25,222,216	66,348,160	192,000	66,540,160
Florida.....	33,895,534	35,072,640	2,677,120	37,749,960
Idaho.....	11,563,227	53,293,440	356,480	53,649,920
Illinois.....	35,842,560	35,842,560	1,504,000	37,346,560
Indiana.....	22,950,400	22,950,400	465,280	23,415,680
Indian Territory.....		19,714,560	279,680	19,994,240
Iowa.....	35,646,080	35,646,080	360,720	36,012,800
Kansas.....	51,314,703	52,382,720	248,320	52,631,040
Louisiana.....	27,419,735	29,655,260	2,705,280	31,760,640
Michigan.....	36,358,039	36,819,200	25,894,400	62,713,600
Minnesota.....	45,723,852	51,198,080	4,056,320	56,254,400
Mississippi.....	29,592,700	29,685,120	343,040	30,028,160
Missouri.....	43,604,159	43,795,840	451,840	44,247,680
Montana.....	18,521,710	83,593,600	525,440	94,119,040
Nebraska.....	40,673,662	49,137,280	482,560	49,619,840
Nevada.....	3,102,651	70,336,640	497,920	70,834,560
New Mexico.....	18,820,356	78,428,800	90,880	78,519,680
North Dakota.....	31,125,939	44,910,080	452,480	45,368,560
Ohio.....	26,062,720	26,062,720	2,394,240	28,456,960
Oklahoma.....	19,567,824	24,715,720	158,720	24,874,440
Oregon.....	26,208,219	61,277,440	698,880	61,976,320
South Dakota.....	26,260,109	49,206,400	444,800	49,651,200
Utah.....	5,087,495	52,541,440	1,812,480	54,353,920
Washington.....	22,488,617	42,746,880	2,420,480	45,167,360
Wisconsin.....	34,770,983	35,274,880	6,840,320	42,115,200
Wyoming.....	9,992,017	62,433,280	208,640	62,641,920
Grand total.....	794,794,384	1,809,539,840	74,481,920	1,884,021,760

The public domain remaining in the possession of the United States includes both the unappropriated and the reserved, a total land area of 1,014,745,356 acres, or about fifty-six percent of the total land surface of the public land states. Comparing this with the present cost, including expenses of the Indians, it will be seen that the present Government holdings have a cost of 14.36 cents an acre. Deducting from the above area the 368,103,680 acres of lands in Alaska, and from the cost \$10,000,000 as a roughly assumed present cost for Alaska, leaves the cost of the public lands remaining in the United States 20.99 cents an acre.

It is, however, evident that if the cost of taking care of the Indians is to be included, upon the theory advanced by Mr. Donaldson, this cost, including the future estimated cost, should be charged against the entire original area of the public domain, as a part of the original purchase price which is still being paid. While during the first one hundred years of our Government the cost of the Indians averaged only a

little over a million dollars annually, during the twenty-one years from 1883 to the close of the fiscal year 1904 the average annual cost was a little over \$9,700,000. This expense will rapidly decrease with the acceptance of individual allotments and the passing of the individual from the condition of a ward of the Government into that of independent citizenship. It is, however, a small estimate to place the final cost of the Indian department at \$600,000,000; which, added to the actual cost of purchases would make a total eventual cost of \$694,435,231.15. Upon the total land area of the public land states and territories (exclusive of Alaska and deducting \$10,000,000 from the cost as the assumed present cost of Alaska) this is a cost of 40.54 cents an acre. Upon the 794,794,384 acres already appropriated in the public land states the gross returns of the land office (less distribution of proceeds and cash paid in swamp land indemnities to the states) amount to fifty-six cents an acre, and the cost for administration, survey and disposition has been twenty-two cents an acre. The remaining public domain must, therefore, realize 41.9 cents an acre above the cost of survey and disposition, if the United States is to come out whole on its public lands and on its Indian charges, considered together. These figures do not take into consideration the amount of land required to satisfy outstanding railroad and other land grants and private land claims pending and scrip issued in settlement therefor and still outstanding. As an offset, it does not consider the considerable portion of the original public domain in these public land states which went to satisfy reservations in the deeds of cession by the states, or private land claims existing at the time of cession or of purchase and subsequently allowed by the United States, or, in many cases, still pending. There should also be considered the fact that the process of selection has left the more undesirable lands unselected, greatly reducing the average value of the remaining public lands as compared with that of the original holdings; this being in turn offset by the general enhancement of land values with the development of the country.²³

It should, however, be considered that in acquiring and disposing of this immense domain the United States has occupied a position far more dignified and responsible than that of a mere dealer in real estate. In

²³ The report of the Commissioner of the General Land Office for 1904 gives the total of lands disposed of during the year ended June 30 at 16,405,821.75 acres; gross receipts of the land service \$9,283,341.98, and gross expenditures and estimated liabilities \$2,100,093.92. These figures (which include Indian lands in both the acreage and the receipts) show returns of 56.58 cents an acre on the amount disposed of, and costs of survey and administration at 13.8 cents an acre, which includes expense of inspecting mines in territories and expense of protecting forest reserves.

her purchases of territory she secured not only land but governmental jurisdiction; an extension of the boundaries of the nation, and increased opportunities for the development of national wealth and prosperity. In disposing of them she has for a half century sought not for revenue but for the encouragement of settlement and development of new communities. The purposes which were thus sought to be accomplished have constituted the national land policy; and the methods and instrumentalities through which their accomplishment were sought have constituted the public land system. An historical consideration of these will now be in order.

ADMINISTRATION OF THE PUBLIC DOMAIN.

The present public land system of the United States is an historical outgrowth, and, in many features, an historical relic which has outlived its period of usefulness. It is a result of political contentions and compromises of issues long since dead, and also of real and actual needs now largely disappeared. Founded at the outset upon the policy of disposing of the land rapidly in large lots with the idea of producing revenue for an impoverished government, it has become a system of paternalism to actual settlers and of restriction of disposition in other directions, through provisions which often offer loopholes for cunning and fraud and are a restraint chiefly upon honest enterprise. The reforms now badly needed in the land department have for some time been under consideration by a Public Land Commission whose reports and recommendations will receive subsequent consideration in this chapter. A knowledge of past events is necessary in order to understand present conditions, and the more important which have had their influence will be briefly given here, referring the reader to general historical works for more complete information.

Coming into possession of the great domain whose extent and origin have already been given, nearly all of it unsettled and unoccupied territory, the United States, as already suggested, assumed both ownership and government jurisdiction. The first involved the control and disposition of the lands, and the second involved the responsibility for the extension of a form of government over the territory. Even before its acquisition of the first foot of territory through state cessions, Congress had outlined a policy in regard to the prospective public domain, in the resolution of October 10, 1780, already quoted (page 347), providing that such acquired territory "shall be disposed of for the common benefit of the United States, and shall be formed into distinct republic-

an states, which shall become members of the Federal Union, and have the same rights of sovereignty, freedom, and independence as the other states." This was the corner stone of the territorial system of the United States, and upon it subsequent legislation was founded. It laid down the general principles both for the disposition of the land by the Government and for the establishment of forms of government.

The first legislation following the principles of this resolution was reported out by a committee of which Thomas Jefferson was chairman, on the same day that Virginia ceded her claims to the Northwest Territory—March 1, 1784—and with subsequent recommitment to the committee, and some additional amendments, was adopted April 23, being known as "the ordinance of 1784." This ordinance applied to all the territory, both north and south of the Ohio River, in providing that settlers might organize for themselves a temporary government, with a representative in Congress having the right to engage in debate but not to vote. When, however, the population of the State had increased to that of the least populous of the original states it might be admitted with the assent of nine states, as required by the Articles of Confederation, and then have equal privileges and representation. As the resolution referred to in the preceding paragraph had provided that new states to be organized should have "not less than 100 nor more than 150 miles square" of territory, the original draft of this ordinance provided for the division of the Northwest Territory into states, extending north and south between odd numbered parallels of latitude beginning with the thirty-first, and east and west, to the Mississippi River and to the meridian of the western cape of the mouth of the Great Kanawha River, from the meridian passing the lowest point of the rapids of the Ohio River, which served as the boundary between the eastern and western tier of states. No attempt was made to establish state boundaries for the southwest territory, the committee stating that it did not have sufficient information for the purpose. To the new states were assigned such fanciful names as Sylvania, Michigania, Chersonesus, Assenisipia, Metropotamia, Illinoia, Saratoga, Washington, Polypotamia, and Pelysipia. As finally amended these names were stricken out, as also the definite state boundaries laid down, together, also, with the original provision that slavery should not exist in this territory after the year 1800.

It is generally believed that Jefferson, in drafting this law, was governed by Washington's advice; but this law proving a dead letter,

and no settlement occurring under it, we find Washington later advocating the marking out of a single state instead of ten. This seems to have been because the antislavery sentiment was then strong and rapidly developing in the northern states, and they did not favor the formation of ten new states in which it would be permitted; and the tide of settlement from these older northern states which later invaded the Ohio Valley and beyond, was accordingly slow in manifesting itself. The question of government of the territory, however, came up again in 1786 on a petition from the inhabitants of the Kaskaskias. This and renewed agitation for abolition of slavery in the territory had its culmination in the celebrated ordinance of July 13, 1787,²⁴ which has had a dominant influence not only upon all subsequent legislation but upon the forms of government in the states afterwards created from this and other western territory.

The ordinance provided for a governor and secretary to be appointed by Congress, the first for three years and the second for four; also a court of three judges under common law jurisdiction. The act guaranteed the privileges of habeas corpus and of trial by jury, provided for equal distribution of estates among children, with a dower right for life of one-third to the widow, and stipulated that real estate might be conveyed by simple conveyance with witnesses; and, after providing in detail for an assembly and for the formation of township and county organizations from time to time "in parts of the district in which the Indian titles shall have been extinguished," the ordinance continues:

And for extending the fundamental principles of civil and religious liberty, which form the basis whereon these republics, their laws, and constitution are erected; to fix and establish those principles as the basis of all laws, constitutions, and governments, which forever hereafter shall be formed in the said territory; to provide, also, for the establishment of states and permanent governments therein, and for their admission to a share in the federal councils on an equal footing with the original states, at as early periods as may be consistent with the general interest:

It is hereby ordained and declared, by the authority aforesaid, That the following articles shall be considered as articles of compact, between the original states and the people and states in the said territory, and forever remain unalterable, unless by common consent, to wit:

²⁴ As originally drafted, and even at the third reading, this ordinance was quite commonplace; and there has been much controversy over the question of authorship of the remarkable changes which were incorporated in it between this period and its final passage. This question was finally settled by William F. Poole (*North American Review*, April, 1876), who showed that the dominant influence was that of Dr. Manasseh Cutler, then connected with the Ohio Company and engaged in negotiations for western lands on behalf of that company for colonization by New England settlers.

The six articles which follow are too long to be given here in complete form, but Article IV provided that the territory and states formed from it should forever remain a part of the United States; that its inhabitants should pay their just share of federal debts; that state legislatures should never interfere with the primary disposal of the soil by Congress or with its regulations for securing the title of the soil to bona fide purchasers; that public lands should not be taxed, nor non-residents higher than residents; and that navigable waters leading into the Mississippi or St. Lawrence rivers should forever remain public highways without tolls to all citizens of the United States.

Upon the adoption of the present Constitution and its taking effect in 1789 the first Congress passed an act bringing the ordinance under its provisions. On May 23, 1790, the provisions of the ordinance were extended to the territory south of the Ohio River, except the sixth article prohibiting slavery, as North Carolina in her deed of cession had provided "That no regulations made or to be made by Congress shall tend to emancipate slaves."

EARLY DISPOSAL OF PUBLIC LANDS.

The colonies were originally founded under royal grants to companies which were in effect colonization syndicates, and which distributed the lands to the individual colonists in various ways. New communities were often assigned lands in bulk, the local authorities making a redistribution to the first inhabitants and to subsequent comers according to their individual needs—or their standing and importance in the community—for building lots and farms or business sites, with suitable reservations for church and school sites and other public purposes, and as a reservation with which to stimulate further settlement. In New England especially this communal system prevailed. Often these lands were awarded without compensation as a premium to encourage settlement. With the growth of the community real estate would begin to take on a substantial value, by which time the allotment system had largely performed its purpose.

It was but natural that in the early colonization of the western lands the same methods should have been followed. We find, therefore, large colonization syndicates corresponding to the companies which had obtained the early royal charters, purchasing large tracts of land at low prices and colonizing them with eastern settlers who built up the new communities, following the ideas and institutions of the old. Such was the origin of the Ohio Company, formed in New England in 1786, in-

cluding prominent men and a large number of Revolutionary army veterans who used their army land warrants, together with certificates of public debt, in purchasing the lands. Two million acres were at first awarded, but various military and Indian reservations within the boundaries of the grant cut it down to 892,900 acres. The stipulated price was \$1 an acre with a rebate of one-third under certain conditions, and the total price eventually paid was \$642,856.66.²⁵ In the same year (1792) 272,540 acres were sold to John Cleves Symmes and his associates for \$189,693 in army land warrants, and 202,187 acres (the triangular corner of the state west of New York) for \$151,640.25. These sales were made by the treasury board, requiring authorization by Congress for each sale. They were doubly an expedient for the discharge of national debts—first, to the soldiers in accepting army warrants in part payment,²⁶ and second, by using the cash proceeds to pay creditors of the United States. These were the only large sales made prior to the new constitution.

ALEXANDER HAMILTON'S REPORT.

Under the new constitution the public land question was one of the first to engage the attention of Congress. Alexander Hamilton (then Secretary of the Treasury) was called upon for his views, which he embodied in his famous report of July 22, 1790.

This report recognized that there would be two probable classes of purchasers: Those desiring to buy in large quantities for investment or for colonization, and those desiring to purchase small tracts for actual settlement. It recommended the establishment of a general land office for the convenience of the former, and of local land offices which would best serve the convenience of the small purchaser. Hamilton's practical mind also supplied many suggestions as to details, which were actually worked out in practice. In 1800 the act was passed establishing local land offices and officers known as registers, setting a minimum price of \$2 an acre, one-fourth cash and balance in four annual payments. This credit system did not work well and was later abandoned.

In 1812 the General Land Office was established, and in 1849 upon the establishment of the Department of the Interior it was made a bureau of that department.

²⁵ Public Domain, p. 18.

²⁶ Donaldson states (Public Domain, p. 198) that each acre in these warrants was, on the sales above noted, accepted as payment of an acre and a half of land—probably because the regular price of \$1 an acre had been reduced one-third in these sales.

At the time of Hamilton's report the fixed minimum price per acre of the public lands was \$1 an acre. He recommended that this be made thirty cents an acre, but instead it was raised to \$2 by act of May 18, 1796, which, however, included the cost of survey, which Hamilton had recommended should be paid by the purchaser. This act also included the substance of the present rectangular system of surveys, which had been adopted by Congress in 1785 upon report of a committee of which Thomas Jefferson was chairman. The original committee report had recommended townships of ten miles square, which was amended to the present size. Previous surveys had been by metes and bounds, and the origin of the rectangular system back of the committee's report is not known. It is by some thought that the system came from Holland and was primarily of Roman origin.²⁷

Under the credit system up to June 30, 1820, there had been sold 19,399,158.04 acres of land, for \$47,689,563.09; but reversions by forfeiture and otherwise cut the amount down to 13,642,536 acres, and the sum eventually received therefor was \$27,900,379.29. During this time many relief acts for settlers were passed; but on July 1, 1820, the cash system went into effect and the price was reduced to \$1.25 an acre, which has ever since been the basis price on public lands in general. This act, of April 24, 1820, also made it the duty of the President to proclaim sales of public land, Congress having theretofore ordered such sales.

There were thereafter no important changes in the method of disposing of public lands until the passage of preëmption and homestead legislation; and this was the growth of an intervening popular movement or trend of sentiment which must now be considered.

CLAIMS OF THE PUBLIC LAND STATES.

By the provisions of the ordinance of 1787, already mentioned, the states in western territory were to have no interest in the public lands, nor the power of taxing them as long as the title was in the United States. These western states considered this a grievance, and at various times memorialized Congress, pointing out their disadvantage in comparison with the older communities which had the disposal of lands within their boundaries. As a matter of fact these older communities had suffered from the depletion of their population by the tide of western immigration, and had put the price of state lands down in some

²⁷ Prof. Austin Scott, of Rutgers College, in the *Rutgers Targum*, December 12, 1884.

cases as low as fifty cents an acre, cutting under the price of Government lands and producing a correspondingly small revenue to the states. The western states, however, clamored for cession to them of the public lands within their boundaries, at a reduced price. This question was the theme of the famous Webster-Hayne debate in Congress, in which Webster was the champion of the existing land system; and in 1832 it was referred to the House Committee on Manufactures, of which Henry Clay was chairman. The question naturally belonged to the committee on public lands, but there was a political object in saddling the question upon Mr. Clay, because he was then a candidate for the presidency and it was thought that he must make enemies whichever side of the question he took.

The report submitted on April 16, 1832, was, however, a masterly treatment of the subject. Regarding the contention that the price was too high, the report said, "There is no more satisfactory criterion of the fairness of the price of an article than that arising from the briskness of the sales when it is offered in the market." The annual increase in land sales was then offered as an evidence in rebuttal of the contention. It was also said that a reduction of price would be unfair to those who had already purchased, and would be an incitement to speculation, the military bounty lands being referred to as having given more benefit to speculators than to those for whom they were intended.

Upon the question of cession of the public lands to the states, either by gift or by purchase, the committee was equally firm. The public lands involved were worth, at \$1.25 an acre, \$1,362,500,000, and the committee report stated:

It is difficult to conceive a question of greater magnitude than that of relinquishing this immense amount of national property. If they were transferred to the new states, the subsequent disposition would be according to laws emanating from various legislative sources. Competition would probably arise between the new states, in the terms which they would offer to purchasers. Each state would be desirous of inviting the greatest number of immigrants, not only for the laudable purpose of populating rapidly its own territories, but with a view to the acquisition of funds to enable it to fulfill its engagements to the general Government. Collisions between the states would probably arise, and their injurious consequences may be imagined. A spirit of hazardous speculation would be engendered. Various schemes of the new states would be put afloat to sell or divide the public lands. Companies and combinations would be formed in this country, if not in foreign countries, presenting gigantic and tempting, but delusive, projects, and the history of legislation in some of the states of the Union admonishes us that a too-ready ear is sometimes given by a majority in a legislative assembly to such projects.

The report also intimated that the relations of debtor and creditor between the states and the general Government would produce much the same evils as those which had attended the selling of public lands to individuals on credit. Delinquencies would arise and the indebtedness be sought to be avoided or wiped out by relief measures. The report was, however, accompanied by a draft of a bill for distribution temporarily of the proceeds of sale of public lands to the various states. This bill was recommitted, finally passed the Senate, and passed the House in the closing days of the session, but failed to receive President Jackson's signature. In 1835 it was revived by Clay and passed the Senate, but was lost in the House. In 1841 a similar bill was passed as an administration measure, and under it there has been paid out to the various states \$701,578.94, as already given in the preceding financial tables.

A further concession to the public land states was the Preëemption Act passed in 1841, although it was bitterly opposed by Calhoun and by some others who insisted upon the cession of land to the states and were not willing to accept compromises. Lands were still sold at \$1.25 an acre under this act, but it gave preference to the actual settler, at the minimum price, and closed the lands to public sale where a premium over this price might have been secured. At first it applied only where settlement was made subsequent to survey, but afterwards was extended to apply to unsurveyed lands. It was the beginning of the present epoch in the disposition of public lands. Theretofore the primary idea had been revenue to the Government; thereafter it was to be the encouragement of the actual settler and of homebuilding. The act, having outlived its usefulness and having been made the instrument of speculative manipulation, was repealed in 1889.

From the passage of this act to that of the Homestead Act in 1862 no legislation of a general character was enacted regarding the disposition of public lands. There were during this period a number of donation acts, designed to encourage settlement upon the frontiers. Of this character was the act passed in 1842 for the territory of East Florida, granting a quarter-section of land free to persons able to bear arms, certain locations for such settlement being designated. There were somewhat similar acts for Oregon, Washington and New Mexico. In 1849 and 1850 the swamp land legislation was enacted, giving swamp lands to the several states, the proceeds to be used for levees and drainage, and other public improvements. These acts are still in force,

and the various states to which they apply have, to June 30, 1904, selected 82,699,235.33 acres of swamp lands, of which amount 65,015,414.86 acres have been approved and 62,645,909.28 acres patented. Claims for 8,674,324.32 acres have been rejected.

THE HOMESTEAD LAW.

The preëmption law has been referred to as marking a change in the Government land policy, the promotion of settlement being placed above the question of revenue. As a matter of fact, this law combined both principles and was a transition step to the giving away of land to actual settlers, with no charges except sufficient to cover cost of survey and disposition.²⁸ This was the effect of the Homestead Act, finally passed in 1862, but which had been a burning issue in the national politics of many previous campaigns. This question gave its name to the Free Soil movement originating in 1848, though slavery and other issues were also involved in that movement. The land agitation of that time involved four contentions on the part of the radicals: 1. Freedom of the public lands in a limited way to actual settlers. 2. Cessation of the sale of public lands to nonresident purchasers. 3. The exemption of homesteads. 4. The restriction of the purchase of any other lands to a limited quantity. All these principles have now found a place in the land system.

The Free Soil Democracy in 1852 held a convention in whose platform appeared the following clause:

"The public lands of the United States belong to the people and should not be sold to individuals, nor granted to corporations, but held as a sacred trust for the benefit of the people, and should be granted in limited quantities, free of cost, to landless settlers."

In the campaign of 1856 the Free Soil movement, as such, had disappeared with the birth of the Republican party, which, however, stood for the same land principles. The main issues of the campaign were free homes and the restriction of slavery.

The homestead movement entered Congress in 1859, a bill passing the House by a vote of 120 to 76, but failing in the Senate. A compromise between Senate and House passed a bill in 1860 which President Buchanan vetoed, giving in detail reasons, some of which may be summarized as follows:

²⁸ Donaldson (*Public Domain*, p. 533) shows that the General Land Office would not be self-sustaining from fees and commissions alone, but must depend partly upon revenues from cash sales to pay current expenses.

Congress has no power to give away the public lands, either to states or to individuals.

The bill would prove unequal and unjust among the actual settlers themselves. The old settlers are public benefactors, and have paid \$1.25 an acre for their lands. It is unjust to them that new settlers should be allowed to come in and pay the greatly reduced price for lands.

This bill will prove unequal and unjust in its operation, because from its nature it is confined to one class of our people. The mechanic who emigrates to the West, and pursues his calling, must labor long before he can purchase a quarter-section of land; while the tiller of the soil who accompanies him obtains a farm at once by the bounty of the Government.

At present the older states receive their share of the benefits from the land revenues going to the general treasury; but the homestead law would not only deprive them of this revenue, but offer a premium for emigration from these states.

This bill will open one vast field for speculation.

The bill requires native or naturalized citizens to be heads of families, but makes no such requirement "when applicable to persons of foreign birth recently arrived on our shores."

The effect of this bill on the public revenue must be apparent to all. . . . The Secretary of the Interior estimates the revenue from the public lands for the next fiscal year at \$4,000,000 on the presumption that the present land system would remain unchanged.²⁹ Should this bill become a law, he does not believe that \$1,000,000 will be derived from this source.

In the Senate the question of passing the bill over the veto received twenty-eight affirmative votes to eighteen negative, less than the necessary two-thirds required to pass it.

The homestead law was, however, passed in 1862 and received President Lincoln's signature on May 20, forming the substance of the present homestead law. There have been numerous amendments affecting the details, which cannot be given here, but the principle of the law remains the same. Its current provisions will be given farther on in this chapter.

Another historical act for the distribution of land to individuals was the Timber Culture Act passed March 3, 1873; amended March 13, 1874, and by further acts up to June 14, 1878, which was repealed March 3, 1891. The act of 1878 provided substantially for the planting and growing for eight years of one acre of timber to each sixteen acres of land in a quarter section or less, when free patent will issue. The acts of 1873-4 permitted homesteaders to take the option in lieu of cul-

²⁹ This appears to have been a very extravagant estimate. While the bill did not become a law, the gross receipts for the fiscal year referred to (ended June 30, 1861) were actually only \$870,658.54. This may have been partly an effect of the war; yet the gross receipts for the previous fiscal year, approaching its close at the time this veto message was written, were but \$1,778,557.71, an increase of less than \$12,000 over the previous fiscal year, and it was absurd to anticipate that the next fiscal year would show an increase of over \$2,000,000.

tivation requirements, and required cultivation of the timber for but two years. Although the act had been repealed fourteen years there were final entries under this act in the fiscal year 1904 of 70,640.05 acres, on which the original entries had been made prior to the repeal of the act.

There have also been numerous special acts granting land to individuals or to the states, which cannot be considered here except in so far as they have a bearing on the present disposition of lands, and particularly the acquisition of timber lands by lumbermen. In this class will be included the private land grants for which scrip was issued assignable in character, which scrip has been used in considerable quantities for the purchase of timber lands. Soldiers' additional homestead entries are also assignable and do not require residence or cultivation, as will be seen in the ensuing discussion of the various methods of disposal of the public lands, in their relation to the acquisition of timber lands by lumbermen.

DISPOSAL OF PUBLIC LANDS IN QUANTITY.

In the past the private acquisition of timber lands from the public domain has largely been under laws for its disposal in considerable areas. These disposals have been to individuals, by private entry and public auction; to the states, under grants for education, for internal improvements, grants of swamp lands and grants of desert lands; and to railroad, canal and military wagon road companies as bounties for construction work of public benefit. The states and corporations receiving such grants have, in turn, sold the lands to individuals for the raising of funds for the purposes of the grants, and many of the timber land holdings have been secured in this way.

ACQUISITION BY PUBLIC SALE.

The first provision for the disposal of public lands was by public sale to the highest bidder; and this system continued for many years. Such sales were proclaimed by the President until in 1846 the Commissioner of the General Land Office was authorized to order lands into the market. Lands offered at such public sale and remaining unsold were known as "offered" lands, and were then subject to private sale at the minimum price of \$1.25 an acre. While public sale was a generally recognized early method of disposing of the lands received by state cessions, not all the subsequent acquisitions have been subject to such sale. Most of the land in the Louisiana Purchase has been subject to public sale. In 1866 Congress reserved the public lands in Arkansas,

Louisiana, Mississippi, Alabama and Florida from public sale for homestead purposes, but this act was repealed in 1876 and the lands brought into the market for sale. The alternate sections in the Pacific railroad grant were reserved by the Government for homestead and preëmption entry. The act of March 3, 1891, forbade public sale of public lands, except abandoned reservations and disconnected fractional tracts. No great areas of public land have been disposed of in this manner, the total sales from 1884 to 1904, inclusive, being less than 621,000 acres.

SALE BY PRIVATE ENTRY.

All lands which had been offered at public sale and remained unsold were formerly subject to private entry at the minimum price per acre fixed by law. With the adoption of the Homestead Act the general sentiment was for the restriction of land sales at \$1.25 an acre, and no very great proportion of the public domain, especially west of the Mississippi, was ever offered in this way, consequently the area subject to private entry remained somewhat limited. An exception was, however, made in the case of five southern states above referred to, all the land in which was offered for sale soon after the congressional restriction upon its sale was removed in 1876. At that time, however, there was no general demand for the land, and it remained subject to private entry until in the '80's the value of southern pine timber began to be manifest to northern operators; and in that decade large amounts of Government timber land were purchased by lumbermen.

The act of March 2, 1889, withdrew all public lands in the United States from private entry except those in Missouri. Any public lands in Missouri are still subject to private entry, whether they have been offered previously at public sale or not, the distinction between "offered" and "unoffered" lands which existed for so many years having been abolished in 1898. Special acts still make certain other lands, in small amounts, subject to private entry, 22,308.12 acres having been taken in this way in 1904. The total of private entries in the period from 1884 to 1904, inclusive, was 6,119,279.25 acres. There was no limit upon the amount of land that might be secured by a single individual through either public sale or private entry, it being sold in the former case in half sections and in the latter in any desired subdivision down to a quarter quarter section.

GRANTS OF LAND TO THE STATES.

The clamor made by the public land states for an interest in the public domain lying within their boundaries, while it did not secure a

cession of the lands in toto, had its influence upon the amount of cessions made by the United States to the various states for specific purposes, already mentioned.

GRANTS FOR EDUCATION.

The first school grant was that of the ordinance of 1785 of the sixteenth section in each township, which was reserved for this purpose. There was no provision as to its ultimate disposition, but upon the admission of Ohio, and thereafter in the case of all the other states, these lands were turned over to the State for administration. In the admission of Oregon and all subsequent states both sections 16 and 36 in each township have been set aside, and these sections have been reserved in the public lands in the territories, for their benefit when they shall have become states. When these sections are mineral in character, or otherwise appropriated, other sections are selected. The total grants of this character have been about 68,000,000 acres, but, owing to the scattered nature of the selections, they have been of little importance in the formation of timber holdings.

UNIVERSITY GRANTS.

Under various special acts Congress has made university grants of 40,000 to 60,000 acres to each of specified universities in the various states, aggregating about 1,200,000 acres to 1883.

AGRICULTURAL AND MECHANICAL COLLEGE GRANTS.

In the year in which the homestead law was passed (1862) Congress provided for grants of 30,000 acres to each state for each senator and representative in Congress for the benefit of agricultural and mechanical colleges existing or to be established in conformity with the terms of the act. In certain public land states these lands were granted "in place;" in the other states, scrip was issued which could be located in any public land state, upon land subject to private entry, or could be used in preëmption payments or in commutation of homestead entries. Many of the states receiving such scrip sold it at prices as low as fifty cents an acre, and much of it was used in the location and purchase of timber lands, though it did not offer any special privileges in the selection of lands not available for ordinary cash purchase. In one notable instance (that of Cornell University, Ithaca, New York,) this scrip was held in trust and timber lands located with it, chiefly in Wisconsin, which were held for investment for many years. An individual trusteeship was necessary, because by the provisions of the act the states could

not themselves use the scrip in locating lands in other states, but only their assignees. Ezra Cornell bound himself by contract to purchase the scrip at sixty cents an acre, locate the land and pay taxes on it for twenty years and at that time sell it for the benefit of Cornell University. This time expired in 1886, but the time was extended ten years. The eventual returns from the 500,000 acres of timber which Mr. Cornell purchased with the sixty-cent scrip, after paying the cost of administration and carrying cost, were nearly \$5,500,000, or \$11 an acre. There was granted under this act to 1883 1,770,000 acres of lands in place and 7,830,000 acres of scrip. The amount of such scrip that was locatable in any one state was limited to 1,000,000 acres, and not more than three sections in any township. The reports for the year ended June 30, 1901, show that there had been granted to that time 10,320,843 acres, of which 1,030,572 acres remained unsold. The funds from these sales are kept intact as endowments, the interest only being expended; and on the date mentioned the invested funds amounted to \$10,806,780, yielding 6.3 percent. The provisions of this act have been held to apply to new states upon their admission without special new legislation.

There have been other special grants for education, the aggregate public domain set aside for this purpose being about 87,000,000 acres.

DESERT LANDS.

Congress in 1877 passed an act permitting individual entries of 640 acres of desert land, which will be again referred to with other individual entry acts. By act of August 18, 1894, Congress granted such lands to the states wherein situated, not to exceed 1,000,000 acres in each state, patent issuing upon the lands whenever an ample supply of water shall have been furnished for irrigating them. By subsequent legislation ten years is allowed upon such segregations in which to make the irrigation improvements required in order to secure the patent. Under this act 1,644,556 acres have been segregated temporarily awaiting irrigation improvement; 39,838.06 acres have been patented and 938,236.20 acres have been approved for patent, and 44,826.6 acres were awaiting action upon the date of these statistics, June 30, 1904. It is evident that lands of this character from their very nature cannot be timber lands; and it has been specifically decided that land which will support a growth of trees cannot be arid land within the meaning of the law. The reclamation of arid lands in the West has, however, a connection with lumbering which will be explained in a subsequent reference to the Government Reclamation Service.

SWAMP LANDS GRANTED TO STATES.

By act of March 3, 1849, Congress granted to the State of Louisiana the whole of the swamp and overflowed lands within the State which were unfit for cultivation. September 28, 1850, the grant was extended to Arkansas and other states containing swamp lands; and subsequently extended to Oregon and Minnesota after their admission. The Government survey notes were at first followed in determining what lands were swamp lands under the acts; but afterward overflowed lands were included upon the presentation of other evidence as to their character. In the southern states where surveys were made in wet weather or during the time of spring overflows the surveys showed many tracts as "impassable swamp" which at ordinary seasons were pine upland. The lands were usually, however, actually swamp lands. It was stipulated that the proceeds from the sale of such lands by the states was to be used in their drainage and in levee improvement as far as necessary. In the southern states they were usually redonated to local levee boards which sold them at various prices, large quantities being sold at fifty cents an acre. A large portion of the timber holdings of the South, and especially in cottonwood and cypress, was purchased from levee boards. As these lands were not segregated or withdrawn from entry in advance of their selection by the State, considerable portions of them would be found to be taken up at the time of such selection; and Congress passed indemnity acts providing that where they had been sold for cash the receipts should be turned over to the states as cash indemnity, and where they had been located with bounty warrants or homesteaded the State should be given a lieu selection for other lands. The swamp land grants were not extended to states admitted subsequently, except to Minnesota, Oregon and California; and in these states lands which had been disposed of by the United States were reserved from the grants and a limitation was set upon the time within which selection could be made. Other states have been made land grants of other sorts in lieu of land grants, including North Dakota, South Dakota, Montana, Washington, Utah and New Mexico. The transactions under the swamp land acts until June 30, 1904, have been as follows:

	Acres.
Selected by the states	81,699,335.33
Approved to the states	65,015,414.86
Certified or patented	62,645,000.38
Indemnity claims rejected	8,674,324.32
Land indemnity certified	681,630.23
Cash indemnity, \$2,049,340.84 on	1,717,644.54

In the southern states the proceeds of the swamp lands have been largely used for levee improvements. In Minnesota these lands have

been largely used for railroad bounty lands, in alternate sections, the need for drainage improvement not being so great as in the southern Mississippi Valley. These lands have been very largely timber lands, and have been rapidly disposed of by the various states, being now largely in the hands of private timber owners. Most of these lands have now been taken up by the various states, something over a million acres remaining unadjusted, consisting chiefly of remanent tracts, and being exceeded in area by the indemnity claims remaining unadjusted, over 2,000,000 acres.

SALINE LANDS.

The states have been granted saline springs, usually limited to twelve in number for each state, with sections of land surrounding each spring, to be disposed of as they thought best for school and internal improvement purposes. Additional saline land is for sale at public auction and afterward by private entry at \$1.25 an acre, and all saline land is reserved from entry in other ways. The total disposed of in this way to the states has been but little over a half million acres.

LAND GRANTS FOR RAILROADS, CANALS AND WAGON ROADS.

The first land grants for the improvement of transportation facilities were in aid of wagon roads, Ohio, in 1802, being given one-twentieth of the proceeds of public lands sold in the State, for the purpose of building roads between the Ohio River and navigable waters emptying into the Atlantic. The following year that State was given an additional three percent of the net proceeds of public lands sold in the State, for road-building purposes within the State.

Legislation of this character continued until 1823, when canal building began to occupy attention. The next few years saw canal grants to Indiana, Illinois and Ohio, of alternate section of a strip five miles in width, extending half that distance from either side of the proposed canal. The Illinois canal lands were thereafter, by permission of Congress, merged in the Illinois Central railroad grant. Canal grants continued at various times until the congressional session of 1866, which granted 500,000 acres for ship canal improvements in Michigan and Wisconsin. The aggregate grants of this sort to 1883 comprised 4,424,073.06 acres, and so far as known there have been no canal grants since that time. The grants of money to Ohio for wagon roads were succeeded by land grants, which for "military roads" still continue, the aggregate of such grants to June 30, 1904, being 2,616,796.37 acres.

The germ of the first railroad land subsidy appeared in the act of

March 2, 1833, authorizing the State of Illinois to divert her canal land grant to the purpose of constructing a railroad. The first direct railroad grant was in 1835 to a Florida road, and was very modest in its terms, granting the land for thirty feet on each side of the line, with ten acres at the terminus and the use of timber for 300 feet on either side of the track. Another early grant was that of 1836 to the New Orleans and Nashville railroad, with easements of five-acre tracts not less than fifteen miles apart for railroad stations. The first general railroad land subsidy legislation of importance, however, was that of 1850 relating to the Illinois Central railroad. It established the principles upon which all subsequent legislation of the character has been founded.

The railroad had been projected in 1835, but had been delayed by generally unsettled financial conditions. The original request of the railroad projectors was that Congress give them a preëmption right of the lands on each side of the track for a certain distance back, with ten years' time in which to file the preëmptions, the lands being, meanwhile, reserved for them. Stephen A. Douglas opposed this and favored granting alternate sections to the State of Illinois in trust, the State to make its terms with the railroad company. This grant extended for six miles upon either side of the right of way. It was finally passed September 20, 1850, by a majority of three, through the personal efforts of Mr. Douglas, and with the assistance of southern congressmen secured through an amendment extending the grant to the Mobile & Ohio road, which had been under construction, to connect with the proposed Illinois Central road, but whose construction had been stopped for want of funds. The Illinois Legislature in 1851 granted the lands, 2,595,053 acres, to the railroad company, with a provision for the payment of 5 to 7 percent of the gross earnings of the road semiannually to the State. The receipts from this source had in 1880 given the State a return of over \$3 an acre for the lands, and continue to increase with the growth of the railroad company's business. Other land grants to states for railroad building followed, being always of alternate sections, and usually the odd-numbered sections, the even-numbered being reserved to the United States. Upon such lands the minimum price of \$1.25 an acre is doubled, thus theoretically recouping the Government for the railroad grant. The double minimum lands, where entered by scrip or military bounty warrants calling for a given number of acres, may be taken to half the number of acres specified. Previous to 1879 eighty

acres of double minimum lands were considered equal to 160 acres of other land for purposes of homestead entry, and applicants were limited to this amount; but in that year the distinction between single and double minimum lands, as far as homestead entry was concerned, was abolished as to all even-numbered sections, and as to odd-numbered sections in Arkansas and Missouri, where the grants to railroads had been of even-numbered sections. There were other grants of even-numbered sections to railroads, but prior to 1861, and in 1880 an act was passed by Congress reducing all double minimum lands which had been on the market prior to January 1, 1861, and were still unsold, to the single minimum scale of \$1.25 an acre.

Another historical land grant was that to the Northern Pacific Railway Company, whose extensive history cannot be given here. It was the first grant direct to the corporation, there then being no existing state governments along the greater portion of the proposed road. Alternate Government sections in the grant were reserved for homestead entry.

The total of railroad lands patented, to June 30, 1904, is as follows, the list of patents to railroads including only the patents of 1,000,000 or more to each road:

Patented Direct to Corporations.	Acres.	Acres.
Northern Pacific.....	27,893,370.41	
Sioux City & Pacific.....	19,093,211.02	
Central Pacific.....	9,018,196.53	
Southern Pacific.....	3,609,452.67	
Burlington & Missouri River.....	2,374,090.77	
Oregon & California.....	2,728,153.48	
Atlantic & Pacific.....	2,544,311.31	
New Orleans Pacific.....	1,000,817.70	
And others, making a total of.....		68,426,832.97
Certified to States for Various Railroads:		
Illinois.....	2,595,053.00	
Mississippi.....	1,076,345.03	
Alabama.....	3,348,124.96	
Florida.....	1,911,538.56	
Louisiana.....	1,181,835.61	
Arkansas.....	2,561,881.20	
Missouri.....	1,837,728.15	
Iowa.....	5,015,255.86	
Michigan.....	3,268,549.21	
Wisconsin.....	3,718,940.49	
Minnesota.....	8,544,509.14	
Kansas.....	4,656,568.53	
North Dakota.....	28,322.59	
Total to states.....		39,738,652.12
Total railroad land grants.....		108,165,485.09
Wagon road grants already given.....		2,616,796.37
Canal grants already given.....		4,424,073.06
Total transportation subsidy grants.....		115,206,354.52

Railroad land grants have always been made upon the theory of encouraging railroad construction in sections of the country not yet

sufficiently developed to afford the new road sufficient earnings without such assistance. Naturally, a large proportion of such lands, in the timbered states, were of virgin timber, and have been purchased from the railroads for the timber. Although these lands have always been in alternate sections cornering upon each other, this, in heavy timber, affords a sufficiently compact body for economical lumbering operations, and in many instances it has been possible to purchase the even-numbered sections also, subsequent to their acquisition from the Government by individuals. Various acts of Congress have confirmed settlers in their rights to even-numbered sections of land within railroad grants where their rights antedate the grant to the railroad, but permit the railroad to make other selections from unappropriated odd-numbered sections within the limits of the grant. In all sections of the country, but especially in the South, considerable portions of the present timber holdings have been acquired from railroad lands, supplemented by purchases of alternate sections from individual owners, of school sections or of railroad lien selections to make up a solid body of timber.

STATE SELECTIONS FOR INTERNAL IMPROVEMENTS.

The act of September 4, 1841, granted to each state thereafter admitted, 500,000 acres of land, including any such grants that might have been made to it as a territory. The total grants under this law, up to the admission of Colorado, were 7,806,554.67 acres. In the special acts admitting subsequent states this act is repealed and specific grants are made for educational purposes and for public buildings, the aggregate of which is not at hand. The states have the privilege of the selection of such lands from time to time, and in the land office reports all the state selections under various general and special acts are merged in a single item. The total of such state selections in the period from 1884 to 1904 inclusive, as compiled for this work from the land office reports, is 16,345,195.78 acres.

SCRIP LOCATIONS.

The Government has issued a large variety of land scrip or warrants, in satisfaction of Revolutionary military bounties, of private land claims, in pursuance of Supreme Court decisions, to states for agricultural colleges, to Indians and half-breeds in pursuance of treaty provisions, to soldiers and sailors where their original entries have been for less than 160 acres, for changes in location of entries, and finally as payment for land in Government forest reserves. Most of this scrip has been assignable and could be used in the acquirement of Government land in

any quantity; but much of it is applicable only to lands subject to private entry.

There were issued for services in the Revolutionary War warrants for 2,165,000 acres of land, and on account of the War of 1812 warrants for 4,930,192 acres. The war with Mexico and additional legislation increased the total issue to 66,076,550 acres, of which amount 7,227,960 acres are still outstanding. Originally, these warrants were locatable only in military districts reserved from the public lands for the purpose, with the idea of enforcing immigration and settlement; but this not working well, the bounties were extended to all lands subject to private entry. Up to June 30, 1888, there had been issued scrip, in satisfaction of various claims other than for military bounties, amounting to 1,028,800 acres, and Indian scrip amounting to 488,880 acres. This scrip has been used to some extent in the purchase of timber lands, but its chief use has been in payment for preëmption and other cash entries and in commutation of homestead entries by individuals.

The act of June 4, 1897, in regard to forest reserves, among other provisions contained one by which lands covered by patents, or by unperfected homestead or other claims could be relinquished in lieu of selection outside of the reserve of an equal tract of any vacant unappropriated surveyed land subject to homestead entry, the act of March 3, 1901, confining the selections to lands of this character. This was the lieu selection law, and the certificates under it constituted the lieu land scrip which has for some time been on the market in considerable quantities, being assignable. This privilege of lieu selection is repealed by the act of March 3, 1905, saving previous rights, the intention being hereafter to award cash indemnity instead of scrip in such cases. During the time that it has been in force the transfers under this law have been as follows:

PERFECTED CASES.

	Cases.	Areas.
Number selections received.....	10,853	2,287,746.92
Patented.....	4,502	1,028,363.36
Rejected.....	735	131,356.18
Pending.....	5,616	1,128,027.43

UNPERFECTED CASES.

Received.....	46	7,463.84
Approved for patent.....	14	2,249.00
Rejected.....	12	1,923.76
Cases pending.....	20	3,291.08

The lieu selection privilege has largely been used for the selection of timber lands, there being no restriction as to the character of the lieu selection being the same as that of the land relinquished. It was

entirely regular under this law to enter the finest timber land to be found upon the public domain, with scrip obtained in exchange for barren mountainside areas within forest reserves.

INDIAN LANDS.

The Indian title to land within the United States has been reduced, rapidly of late years, to the area of the present Indian reservations. Abandoned reservations are usually offered at public sale and are afterwards subject to private entry, though in many cases they are specifically excepted from any but homestead entry. During the period from 1884 to 1904, inclusive, the aggregate sales of such Indian lands were 5,265,894.33 acres, as compiled from land office reports. For the previous period no figures are obtainable. The earliest sawmills in Michigan and Wisconsin were located upon Indian lands (which then comprised almost all the land area) upon permission from the Indians, approved by the Government; and Indian reservations since have entered largely into lumbering operations, as timber is available from such reservations under certain provisions of existing laws, while in regard to the public domain there has never been a law authorizing the sale of timber apart from the land. This observation, of course, does not apply to forest reserves, which are withdrawn from the public domain.

RESTRICTIVE INDIVIDUAL SETTLEMENT AND ACQUISITION LAWS.

With the exception of certain special land grants to states for specific purposes, the above comprise practically all the methods under which public lands have passed from the ownership of the United States in large blocks. There have, however, been large timber areas at different times which did not fall under the operation of these various laws, and which, therefore, remained in the public domain except as disposed of under the various laws for the acquisition of land by individuals in restricted areas—the most prevalent unit of limitation being a quarter section, or 160 acres. After such lands have thus passed into the ownership of numerous small individual holders they have, in many instances, been repurchased by lumbermen to make up solid, or nearly solid, tracts of sufficient area for practical manufacturing operations. A brief review of the various methods by which small individual holdings of land can be acquired from the Government at the present time, or could be acquired under laws no longer in force, will, therefore, be of interest, especially as the greater portion of the original public domain has been segregated under the operation of these laws.

The first of these laws was the preëmption law, whose historical development and origin have already been reviewed. The right of preëmption extended to any citizen of the United States, or anyone who had made declaration of intention to become a citizen, who was not already the owner of 320 acres of land in the United States and who had not abandoned the ownership of land in order to take up public land. He must already have become a settler on the land. Actual inhabitation and occupancy of the land must continue until final proof and payment, which must be within twelve months of filing on offered lands (lands which had been offered at public sale and remained unsold) and within thirty-three months on unoffered lands. The preëmtor was required to pay the regular minimum price of \$1.25 an acre (or \$2.50 in railroad grant areas) and the only advantages of preëmption were the ability to hold the land against all claimants by the actual settler and occupant, and the insuring of the minimum price of unoffered land. Land which had been offered was, of course, already subject to private entry at the minimum price, but in practice land sold at public auction has rarely brought any premium over the minimum price. The preëmption law was repealed March 3, 1891, pending rights, however, being saved; so that final preëmption entries are still being made in cases originating before the repeal, over 2,000 acres having been patented under this law during the fiscal year 1904. As to the total area disposed of under the preëmption law from its passage in 1841 to 1883, no exact figures are obtainable, as they were mingled with other cash sales in the land office reports; but Donaldson (*Public Domain*, p. 1247) estimates it at 175,000,000 acres. During the subsequent years to the date of the repeal of the law the disposition under it was 2,000,000 to 3,000,000 acres annually, then dwindling gradually with the diminution of the number of entries or of rights of entry pending at the time of repeal. The aggregate final entries from 1883 to 1904, as compiled from land office reports, was 22,974,157.78 acres, which, with Donaldson's estimate, brings the total acreage disposed of under the law close to 200,000,000 acres.

THE TIMBER CULTURE LAW.

This law applied only to prairie regions and, of course, had no bearing upon timbered land. It was repealed at the same time as the preëmption law, as it was found not to have greatly encouraged reforestation of the prairies. The original entries under this law to June 30, 1883, were 16,768,076.7 acres, and continued at the rate of

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4,000,000 to 5,000,000 acres annually until its repeal, the aggregate for the period subsequent to 1883 being 27,561,191.43 acres, or a grand aggregate of nearly 45,000,000 acres.

DONATION ACTS.

At various times between 1842 and 1854 Congress passed donation acts giving homesteads to citizens in Florida, Oregon, Washington and New Mexico in order to induce settlement in these frontier territories. This was a special concession at that time, but later the Homestead Act made like gifts to everyone from public lands everywhere. The total disposition under these acts to June 30, 1883, (Public Domain, p. 1278) was 3,121,534.52 acres, and since then—more particularly under the New Mexico Donation Act, the last in force—it has been 25,142.37 acres.

DESERT LAND ACT.

The Desert Land Act, as passed in 1875 and amended in 1891, provides for the entering of not to exceed 640 acres of arid land, the entrant being possessor of a water right capable of irrigating the land, and having three years in which to complete the irrigation, being required to spend at least \$1 an acre annually in the irrigation improvement. He must pay for the land \$1.25 an acre, twenty-five cents when making original entry and the balance upon final entry. The original desert land entries aggregated 1,607,310.22 acres to June 30, 1883, (Public Domain, p. 291) and since that time 11,645,511.2 acres, or over 13,000,000 acres in all. The act has been largely an instrument of fraud, as very few sections of arid land are capable of irrigation through the resources of an individual owner. The Government charges \$1.25 an acre for such lands, but gave away the valuable swamp lands which now constitute the rich cotton and sugar plantations of the South.

MINERAL AND COAL LANDS.

Regarding these lands it is sufficient to say that of coal lands the United States has disposed of 40,172.97 acres prior to 1883, and subsequently 245,825.42 acres, at prices of \$10 to \$20 an acre according to distance from an established railroad; of mineral lands it sold, between 1866 and 1883, inclusive, 224,483.54 acres, and subsequently 931,141.9 acres, at various prices, usually \$2.50 to \$5 an acre. Western mineral lands ordinarily do not contain as much timber as is needed for their working, and certain privileges in the taking of timber from adjoining public land are given. Coal lands in the Southeast, and iron and copper lands in the Great Lakes region, are often covered with valuable

timber growths, and lumbering and mining are often associated industries in these regions, though the former occupation requires much greater land areas for an operation of a given magnitude.

THE STONE AND TIMBER ACT.

Although public lands are classified broadly as agricultural and non-agricultural, and the latter subdivided into mineral, coal, desert, etc., there is no classification of timber land as such, and it has been disposed of as agricultural land whenever fit for agriculture after clearing (and often where absolutely worthless for that purpose). Congress, however, by act of June 3, 1878, has provided that land unfit for cultivation and valuable chiefly for timber and stone, not yet proclaimed and offered for sale, may, in California, Nevada, Oregon and Washington, be sold in areas of not over 160 acres to any one individual, at \$2.50 an acre. August 4, 1892, the act was amended to apply to all the public land states. It is conceivable that a quarry business may be profitably conducted on 160 acres of land, but such an area is hardly adequate for the establishment of a lumber manufacturing operation; yet the applicant is required to swear that he is not purchasing the land on speculation, but for his own "exclusive use and benefit." It is but natural that the purchaser of such lands containing timber should undergo a change of sentiment soon after acquiring title, and that such impracticably small holdings should in time become consolidated into larger ones suitable for lumber manufacturing purposes. There has been disposed of, under the provisions of this act, to June 30, 1883, 456,743.91 acres, or less than half the amount disposed of annually during 1903 and 1904. The aggregate disposition from 1884 to 1904, inclusive, has been 7,139,334.37 acres; in 1903, 1 765,222.43 acres, and in 1904, 1,306,261.3 acres.

THE HOMESTEAD LAWS.

We have reserved as the last for discussion the most important of the settlement laws, though it antedates some of those already referred to. Under the original homestead law of May 20, 1862, and subsequent amendments, there had been entered 75,215,164.17 acres to June 30, 1883. (Public Domain, p. 519), and since that time 157,868,778.86 acres, an aggregate of over 130,000,000 acres. One hears the statement that the agricultural lands of the public domain (to which only the homestead acts apply) are becoming exhausted, yet the entries in 1902, 1903 and 1904 have been the largest in the history of the homestead law, being respectively 14,033,245.78, 11,193,120.25 and 10,171,265.97 acres. These figures are for original entries, a certain percentage of

which fail of final patent, but the land office reports are deficient in that they do not show the relinquishments and rejections. The immense reclamation projects now under way have withdrawn large areas of arid public domain, susceptible to irrigation by these projects, from entry other than by homestead; but as only one of these irrigation works is as yet distributing water, but few homestead entries have been made under the operations of the Reclamation Act.

The privilege of homestead entry is extended to citizens of the United States over twenty-one years of age, of either sex, married or single, not already owning over 160 acres of land in the United States. A married woman must be the legal head of the family. A single woman having entered a homestead does not lose the right to prove up on it by marriage, but if the husband also has a homestead upon which proof is not completed at the time of the marriage they must select one and relinquish the other, as they cannot maintain separate residences on the two homesteads. The law extends also to aliens who have declared intention of citizenship, though they must have become citizens before making final entry. They have the advantage of citizens in that they may enter before becoming twenty-one years of age. Citizens who have served at least fourteen days in either army or navy during actual war, however, are permitted to make homestead entry before arriving at the age of twenty-one years. Continuous residence for five years is required before making final entry and securing patent.

It is not necessary to review here subsequent amendments to the original Homestead Act, which merely supplement it in details. Its provisions were, however, subsequently expanded by provisions for adjoining farm homesteads; for additional homesteads; for soldiers' homesteads, and for Indian homesteads. The original homestead privilege was for 160 acres of land in a solid body or legal subdivision. If under this act less than 160 acres were entered, the entry right was considered to have been satisfied. The act of March 2, 1899, permitted the second entry of additional contiguous land to make up 160 acres, without additional residence or cultivation upon the contiguous tract, it being considered as a part of the original entry and patent issuing at the same time; though if for any reason title were not secured to the original entry, the title to the additional entry failed with it. The same act also provided for additional noncontiguous entry to make up a total of 160 acres, final proof having been made upon the original entry, and additional residence and cultivation of the second entry

being required. Originally, as already stated, homestead entry was restricted to eighty acres upon double minimum lands (within railroad grants); but the act of July 1, 1879, made this 160 acres and permitted previous homesteaders to enter an adjoining eighty acres without additional fees or commissions, or to surrender the old entry and take a new one of 160 acres, occupation of the old entry to count on the new, with the provision that occupation of the new or additional entry shall continue for not less than one year before final proof. Soldiers and sailors are, by act of June 8, 1872, given homestead rights to 160 acres, amended in 1901 to include service in the war with Spain or in the Philippines. The time of service is deducted from the five years' occupation otherwise required, except that at least one year's settlement is required. The original entry may be made by agent, but the settlement and final entry must be in person. In case of death in actual service the widow or minor heirs are permitted to make final entry and the entire time of enlistment is taken as full satisfaction for the five years' occupation, and patent may issue upon satisfactory proof of the above facts. If a soldier or sailor die before having made original entry, the right existing to do so, this right passes to his unmarried widow or minor heirs, and if the death occurs during the period of enlistment the entire period of enlistment is deducted from the period required for settlement and occupation. Other privileges are extended, such as the right to abandon residence upon a homestead during the period of service; and particularly by the same act was given the privilege of additional entry to make up 160 acres when the original entry was for less than that amount. Certificates were issued for these additional entries, which became an object of purchase and sale; and though restrictions were at first attempted upon their sale, Congress, on August 18, 1894, validated all previous or subsequent sales, made to bona fide purchasers for value. These certificates constitute the "soldiers' additional" scrip already referred to. Unlike most other scrip it can be located upon any lands subject to homestead entry. By the act of March 3, 1875, Indians abandoning tribal relations are given right of homestead, though not permitted to dispose of the land until after five years from issuance of the patent, retaining, however, a tribal interest in annuities and other funds. The act of July 4, 1894, extended homestead privileges to all Indians located upon public lands, the fee simple, however, being reserved until twenty-five years from the date of the patent, the Government assuming trusteeship during

that period. Indians are also, in special cases, allowed peculiar privileges of homestead on Indian lands otherwise reserved from homestead entry.

The homestead privilege in general formerly extended only to surveyed public lands, but now extends to all unappropriated lands, and, by special provisions, to various withdrawn or reserved lands, such as mineral land on which no valuable mines have been discovered; lands subject to private entry in California and thereafter withdrawn from market; on abandoned or useless military reservations where the settler was on the land prior to reservation for such purposes or prior to 1884; on granted railroad lands subsequent to expiration of grant; on lands sold to the settler by the State of Missouri, which the United States afterwards declared not to be swamp lands and reserved title to from the State; on arid lands withdrawn from other settlement under the provisions of the Reclamation Act, under such limitations of the homestead area as are prescribed in each particular irrigation tract under the provisions of that act, and many other special privileges of entry which cannot be enumerated here.

Like the supplementary laws requiring a term of residence, the homestead law was drafted with the idea of encouraging settlement and the building up of communities. Had homestead entry actually been restricted to lands suitable for agricultural pursuits the purposes of the law would have been more closely met; but under it there has been permitted the entry of lands which from their very nature were not fitted to afford to occupants a permanent means of livelihood, including grazing lands of such a character that large areas would be required for a profitable grazing industry, and, at the time at least, incapable of affording a living through tillage of the soil; including, also, timber lands which, when denuded of their forest cover, became barren sand wastes. In many other cases timber land when cleared had some agricultural utility, but its value per acre would be much less when fitted for cultivation than in its virgin state; and such land should not have been classified as agricultural. Its reservation in the same manner as coal and mineral land and salines, and its disposition with special reference to the utility of the timber for lumber manufacture, or the sale of the saw timber by the Government and the subsequent opening of the partially cleared land to homestead entry, would have been carrying out the policy of the Government as shown in regard to the other mentioned classes of lands. Instead, the policy was in-

augurated—and continues to the present time—of classing all timber lands as agricultural except where, under the provisions of the Timber and Stone Act already cited, the entrant prefers to declare that the lands are unfit for agriculture, in order that he may secure 640 acres at \$2.50 an acre instead of 160 acres as a gift. In other words, the Government gives away its timber lands which (in the opinion of the entrant and his witnesses) may be suitable for agriculture; but if they are lands which will be worthless after the timber is removed, it charges \$2.50 an acre for them.

An inevitable result of this policy on the part of the Government was that in many cases lands would be taken under homestead entry for the purpose of selling the timber and then abandoning them, or of securing final title and selling both lands and timber to adjoining larger timber owners, or of securing title to grazing lands to be concentrated into large range holdings in the same way. In many parts of the country during long periods it has been impossible to purchase either timber or timber lands from the public domain at any price, and often the only resource has been the purchase from homesteaders. Such was the case in the five southern states of Alabama, Mississippi, Louisiana, Arkansas and Florida, during the period when all the public lands in these states were reserved for homestead entry, prior to July 4, 1876. Such was the case in California, Oregon, Nevada and Washington prior to the passage of the Timber and Stone Act of June 8, 1878, which limited the lands which might be acquired by any one individual to 640 acres. Upon this point the Public Land Commission, in its report of February 21, 1880, recommending the sale of public timber at a graduated price, said:

It is proper to say that much difficulty is encountered in trying to suppress depredations upon the timber on the public lands.

The difficulties arise from a variety of causes, chief among which has been, and still is, the impossibility of purchasing in a straightforward, honest way from the Government either timber or timber-bearing lands.

Settlements upon timber-bearing lands in the states and territory mentioned in the act [the original Timber and Stone Act, applying to the far West], under the homestead and preëmption laws, are usually a mere pretense for getting the timber. Compliance with those laws in good faith where settlements are made on lands bearing timber of commercial value is well nigh impossible, as the lands in most cases possess no agricultural value, and hence a compliance with the law requiring cultivation is impracticable.

In such parts of the states of Michigan, Wisconsin, Minnesota and Missouri as contain public lands, which are at the same time agricultural and timber lands, the title may be obtained only under the homestead and preëmption laws.

There is no way provided by law for disposing of lands which are chiefly valuable for timber of commercial value in those states, as it must be conceded by all that the homestead and preëmption laws apply only to lands valuable for agriculture.

The condition stated in the report still exists, except that the preëmption law has been repealed.

Instead of restricting homestead entry to lands suitable for such entry, the Government has attempted the larger and more impossible task of restricting the settler's administration of the homestead during the period of occupation before receiving final patent. The land, though reserved to the settler by the act of entry thereon, is still the property of the United States, and the settler's position prior to issuance of patent is by numerous decisions held to be analagous to that of a tenant for life. The principle upon which the court decisions rest is stated in "Washburn on Real Property" as follows (first edition, vol. 1, p. 108):

In the United States whether cutting any kind of trees in any particular case is waste, seems to depend upon the question whether the act is such as a prudent farmer would do with his own land, having regard to the land as an inheritance, and whether doing it would diminish the value of the land as an estate.

Questions of this kind have frequently arisen in those states where the lands are new and covered with forests, and where they cannot be cultivated until cleared of the timber. In such cases, it seems to be lawful for the tenant to clear the land if it would be in conformity with good husbandry to do so, the question depending upon the custom of farmers, the situation of the country, and the value of the timber. . . . Wood cut by a tenant in clearing the land belongs to him, and he may sell it, though he cannot cut the wood for purposes of sale; it is waste if he does.

It is evident that a strict construction of the principle laid down in the first paragraph above quoted would absolutely prohibit a settler from clearing land where the value of the land so cleared was less than its value with the virgin timber upon it; which has been the case with much of the land upon which homestead entry has been not only permitted but encouraged by the Government. Such a clearing is a diminishing of the value of the estate; yet without this clearing the settler cannot comply with the provisions of the law as to occupation and cultivation. Upon this point the courts have allowed some latitude. "In theory, at least, the land is better and more valuable with the timber off than with it on. It has been *improved* by the removal." (U. S. vs. Cook, 19 Wall 591). The doctrine is further laid down in this decision:

"It [the timber] can be rightfully severed for the purpose of im-

proving the land, or the better adapting it to convenient occupation, but for no other purpose. When rightfully severed it is no longer a part of the land, and there is no restriction upon its sale."

This decision would, therefore, seem to justify the removal of all the timber from the land without restriction, if the clearing of the land and not the sale of the timber is the principal object in view, as laid down farther on in the decision. Other authorities do not agree with this liberal and reasonable interpretation, or, at least, inject into the subject certain other drastic principles of interpretation of the purpose of the settler under given circumstances. The land must be cleared for the purpose of cultivation. (U. S. vs. Lane, 19 Federal Reporter 910, and many other decisions); and a use of the land for grazing purposes, without plowing it up, is not cultivation as meant by the law (U. S. vs. Niemeyer et al., 94 Federal Reporter 147). The learned court here may be credited with little actual knowledge of agricultural conditions on newly cleared lands. As a matter of fact, the plow is an unknown implement of tillage upon such lands. Until, in the course of time, the stumps and roots shall have sufficiently decayed to permit their economical removal, the first crops of corn or potatoes must be worked in among the roots with a hoe or mattock; patches of grain are sowed upon the burned over ground without other tillage than that afforded by the harrow, and the settler must rely largely upon the pasturage of beef and milch cattle and crops of hay, the most practical product of newly cleared land, which the court has seemingly entirely overlooked. It was the sale of hay to the logging camps, supplemented somewhat by the sale of dairy products, swine and beef, that made possible much of the earlier settlement of Wisconsin and other northern timbered country; but in this, the only practical method of agriculture at the time, the settler was outside of the course of action laid down by the law and its weird interpretations. It was, perhaps, admissible to clear the land for grazing purposes, for the raising of hay or for other uses not involving "plowing it up," if the timber were burned; but an attempt to sell the timber under such circumstances would at once render the settler a criminal under the enlightened rulings of the land department and the courts. By such erratic interpretation and administration of the law has it been endeavored to cure the aberrations inherent in the law itself; and it is little to be wondered that there should have been laxity of enforcement and lack of compliance with the real spirit of the law, under conditions which afforded little repression of shrewd inten-

tional fraud, but acted as an embarrassment and hardship upon all whose desire was to comply honestly and strictly with the homestead requirements.

The decisions of the courts have also recognized as lawful the removal of timber for the purpose of constructing necessary improvements, such as buildings and fences, or the exchange of timber for lumber to be so used. Some decisions appear to sustain the exchange of timber for an amount of lumber of equal value; but in others the principle is laid down that the exchange must be on the basis of quantity instead of value, and in *United States vs. Shiver* the defendant was convicted for selling timber to the value of \$128, though the proceeds were put into improvements valued at \$229. The use of timber in this way for building improvements is provided for aside from and in addition to the removal of timber in preparing the land for cultivation; as, for instance, where the settler desires to build before having prepared for the cultivation of his land.

Homestead settlers also have the privilege of commutation after fourteen months' residence—that is, have the privilege of paying for the lands at \$1.25 an acre and receiving patent therefor—by the original Homestead Act. This provision has been a great incentive to the taking of homesteads by persons who did not in good faith desire them for their own use, but for speculation and subsequent disposition. It rendered the five years' residence unnecessary, and in effect perpetuates in the homestead law the evils which existed under the preëemption law and which were instrumental in finally securing its repeal. Commuters of homestead entries also have the privilege of additional entry, which second entry is not subject to commutation. Homesteads on irrigable land under the provisions of the Reclamation Act are also not commutable. The act of April 8, 1904, permits a second [p. 79] entry where the first was not perfected by the settler "on account of some unavoidable complications of his personal or business affairs, or on account of an honest mistake as to the character of the land," and where the relinquishment or abandonment was not for a consideration; and such second entries are also not commutable.

THE RECLAMATION ACT.

Another great epoch in the public land system of the United States was inaugurated with the passage of the act of June 17, 1902, popularly known as the Reclamation Act. It introduced the principle of using the proceeds derived from the disposition of that portion of the public domain located in the specified arid or semiarid states in fitting the

arid portions of it by irrigation for disposition and settlement in its turn, the cost of such improvement being assessed against the land in ten-year installments, and coming back into the reclamation fund to be used in further irrigation improvements. As the fund is thus never decreased and is being constantly enhanced by the net receipts of the General Land Office it will, in time, reclaim all the desert portions of the country susceptible of practical irrigation, and will tend to decrease floods on the lower rivers by holding the flood waters back in reservoirs to be used in irrigation and incidentally to add to the streamflow during the low water season.

The Reclamation Act briefly provides that the entire proceeds of the sale of public lands, and of surplus fees and commissions, less the percentage payments to the several states, shall be set aside for a reclamation fund. Surveys for projected irrigation works are provided for, as also the withdrawal of the lands from market. When the area is determined which can be watered by the proposed work, this area is made subject to homestead entry and the balance of the withdrawn area is restored to the unappropriated public domain. Homestead entry is, however, subject to further provisions of the act, that the unit area capable of entry, while it may be as large as the usual area of 160 acres, may also in certain cases be restricted to as low as forty acres, and these homestead entries are not commutable, but require five full years' residence and occupation in order to secure patent. No one person is allowed to own over 160 acres within a single irrigation district, and if he is the prior owner of more than that area he must dispose of the surplus portion before a water right will be supplied him. The entire cost of the irrigation work is assessed against the area of land served and becomes a lien upon the land; and upon payment of the sum in ten annual installments the landowners of the district become the sole owners of the irrigation system, and the Government relinquishes control to them. To do this work there has been organized a Reclamation Service under the Geological Survey, Department of the Interior, and a number of important and expensive irrigation works, such as could hardly have been successfully inaugurated under individual or corporate enterprise, are now under way. The funds turned over to the Reclamation Service during the first four years after the law went into operation amounted to \$34,207,000.

As the operations of the Reclamation Act are confined to the arid lands, it might be thought that they, like the other desert land laws,

have little bearing upon the lumber business. The great forest reserves of the West have, however, largely been established for the protection of the headwaters of the western streams, and these waters are in turn being conserved with a view to their use in irrigation. The conservation of the forest regions and the irrigation of the arid plains are closely allied subjects, which, however, belong in a subsequent chapter.

RELATION OF LAWS TO LUMBERMEN.

Lumbermen have been the chief sufferers from the flaws in the public land policy in general, some of which President Buchanan, in his veto of the homestead bill, pointed out in regard to that legislation, as already referred to in this chapter. His criticism that the law provided a home for the farmer but not for the mechanic or artisan has its retort in the query as to what an artisan or mechanic, as such, could do with 160 acres of land. The possession of land is not a necessary incident of his calling, however necessary or useful the calling may be. In the settlement of a new country lumber is, however, a necessity and the sawmill an important establishment, requiring for its operation the opportunity to purchase timber or timber-bearing land, as well as an adjunct for the economic development of the wooded homestead. Under the interpretation of the homestead law above given it would be possible to establish a small custom mill to saw lumber for the settler by the thousand feet, or on the plan of a custom grist mill; and yet the decisions would seem to forbid the taking of toll in a certain proportion of the product to pay for the sawing, and the farmer must wait until he has earned money from other sources to pay the saw bill in cash. Such a plan might be sufficient to supply local lumber needs after a fashion; but beyond that, the timber resources of a new country, like its other resources, should be available for enhancing the wealth of the community during the early period when it is most needed. To restrict the use of timber in such a community to the actual local needs is as detrimental to its development as would be a similar restriction of the mineral resources, which has never been enforced.

The pioneer lumbermen of the earlier days did not suffer particularly from such restrictions. Timber was long held at prices very little beyond the actual logging cost. Later advances in stumpage were more than offset by advances in lumber values, and there was still available for purchase much Government land by public sale and private entry. Little practical restraint was placed upon homesteaders in the disposal of timber. Of late years, however, with the discontinuance of

public land sales and of private entry, the deficiency of the public land system in making no provision whatever for the direct acquisition of timber by lumbermen from the public domain, in areas adapted to the establishment of a lumber manufacturing operation, has been more keenly felt.

This and other defects of the public land systems have been the subject of reports and recommendations by commissioners of the General Land Office and by public land commissions for many years. A report of a public land commission in 1880 has already been quoted. Such a commission is now engaged in elaborate investigation of the subject, and has made two partial reports in March, 1904, and February, 1905. This commission is composed of the commissioner of the General Land Office, W. A. Richards; the chief engineer of the Reclamation Service, F. H. Newell, and the chief of the Forest Service, Gifford Pinchot, all men of eminent ability and authority.

The earlier report points out the importance of the present public lands, embracing an area very nearly one-third the total land area of the country; speaks of the wide diversity of situation and of environment; refers to existing laws as antiquated and as having been drafted with reference to eastern lands, while the western lands which remain are of a different character, and states that the suggestions offered "have principal bearing upon the control, use and disposal of the forest lands, as these are among the most valuable of the lands remaining in public ownership." The repeal of the Timber and Stone Act is recommended, the commission believing "that Congress did not intend that this law should be used for the acquisition of large tracts of valuable timber land by individuals or corporations, but it has been used for such purposes." Provision is, however, made for the needs of the lumberman in the following recommendation of the report:

Some means should be provided by which the matured timber upon the unreserved public lands may be sold, not only for the use of individuals, but also to supply the demands of commerce. There is now a provision of law for the free use of timber in limited quantities for domestic and mining purposes which meets the requirements of those needing small quantities, but there is no provision for the sale of timber except from forest reserves.

We recommend the enactment of a law under which it shall be lawful for the Secretary of the Interior to sell to the highest bidder, at public outcry or otherwise, under such rules and regulations and subject to such conditions and restrictions and in such quantities as he may prescribe, the right to cut and remove, within such period of time as he may fix, any timber from any unappropriated, non-mineral, surveyed public lands, after first having had such timber duly appraised,

and after giving public notice of the time, terms, manner and place of such sale; that he shall have power and authority to reject any and all bids offered at any such sale, and that it shall be unlawful for any purchaser at such sale to sell, transfer, assign, or in any manner alienate the rights secured by him under this act, except as authorized by said secretary; that the act entitled "An act for the sale of timber lands in the states of California, Oregon, Nevada, and Washington Territory" [the Timber and Stone Act], approved June 3, 1878, and all acts amendatory thereof be repealed, and that no lands valuable chiefly for timber shall hereafter be patented under the commutation provisions of the homestead laws; that any person who violates any of these provisions, or any regulation or requirement prescribed pursuant hereto, shall forfeit to the United States all benefits conferred, and all moneys paid by him, and that any right to cut timber which he may then hold shall be canceled and revoked.

The evils of the commutation clause of the Homestead Act are also pointed out, but the committee states that it is not yet prepared to recommend its repeal. The committee also recommends that desert land entries shall be made unassignable, and that provision shall be made for the delimitation of land chiefly valuable for agriculture within forest reserves, by metes and bounds, opening such land to homestead entry.

The second report called attention to the evils of the forest reserve lieu land selection law already discussed, and repealed at about the time of the report; renewed and emphasized the recommendations of the previous report in regard to repeal of the Timber and Stone Act and provision for sales of timber, and recommended that the commutation clause of the Homestead Act apply only after three years' occupation. More stringent provisions were recommended for the Desert Land Act, the purposes of which were briefly reviewed in the following paragraph:

"In short, the law should render impossible the continuance of the practices by which desert lands without water, without cultivation, and without crops are passed into the possession of claimants."

The report also recommended the setting aside of grazing districts and the issuance of grazing permits at a moderate fee, under appropriate regulations modified in each case to conform to local conditions. Other minor recommendations of the earlier report were also restated.

In this summarization of the various ways in which timber lands have passed into the ownership of lumbermen from the public domain, no reference has been made to the use of timber upon the great system of Government forest reserves which have in recent years been set apart from the public domain. This subject will be treated in the succeeding chapter.

CHAPTER XXVIII.

UNITED STATES—FORESTRY AND FOREST RESERVES.

From a time practically contemporaneous with the first colonial settlement the problem of forest economics has been recognized and debated on the American continent. The idea at first took the form of forest preservation rather than of reforestation and progress was slow, because it combated the commercial instinct. In more recent years the forestry idea has not sought to prevent the cutting of timber, but to regulate it so that the timber crop may be continuous. It has sought not only to bring about sensible methods of timber cutting, but also to promote timber culture.

Among the early settlers of the United States the sentiment for forest protection was strong. As early as 1640 Exeter, New Hampshire, sought to regulate the cutting of oak, and in 1682 it was provided in Pennsylvania that "the grantee must keep one-sixth part of the land granted in Pennsylvania in forest." In New Jersey laws against forest fires early appeared on the statute books.

In 1701 it was reported that there were forty sawmills in the Province of New York, and, referring to one equipped with twelve saws, the Governor remarked, "A few such mills will quickly destroy all the woods in the Province at a reasonable distance from them."

The provincial assembly of New Hampshire recognized the forestry cause in 1708, by forbidding the cutting of mast trees on ungranted lands, under penalty of £100. Further, the Province had a surveyor general of forests, appointed by the Crown, for the purpose of preventing depredations upon the timber. In 1770, Adolphus Benzel, son of Archbishop Benzel, of Sweden, was appointed inspector of His Majesty's forests in the vicinity of Lake Champlain, with a salary of £300 a year.

In the days when all transportation had to be carried on by water or by wagon load, the cutting away of supplies in the immediate vicinity of settlements was a serious matter. The Society for the Promotion of Agriculture, Arts and Manufactures, of New York, made an inquiry as to modes of preserving and increasing the timber growth, and in 1795 published a report on the subject. In the first years of the Nineteenth Century, the Massachusetts Society for the Promotion of Agri-

culture took action, in the desire to promote the growth of forests, and offered premiums for forest plantations.

Gifford Pinchot, Chief of the United States Forest Service, says: "The conspicuous care of the forest in regions where at first it was a hindrance rather than a help in the gaining of a livelihood is explained by the early associations of the settlers. They came from a country where wood was comparatively scarce and where the penalties for its destruction were severe and strictly enforced. The respect for the forest which had been bred in their ancestors by the early English game laws and continued in themselves by enactments of extreme rigor was brought over almost without change to the new land, but it was not destined to last. A growing realization of the vast resources at their command, together with the bitter struggle of the farmer against the forest in the early days, gradually replaced care with carelessness and respect with a desire for destruction. The feeling bred by the battle against the forest began to take a dominant place in the minds of the people and to prepare that mental attitude which is still responsible for the greater part of the forest destruction even yet in undiminished progress over by far the larger part of the United States."

With the formation of the Republic the thirteen original states adopted laws for the prevention of forest fires. These were patterned after European models, but omitted the important feature of police. Some impetus was given to the consideration of forest problems in the new republic by the travels of André Michaux and his son, between 1785 and 1807, and the publication of their "North American Silva." The younger Michaux, F. André, testified to his interest in his life work and in the United States in his will, made in 1855, by which he left two legacies, in the following terms:

Wishing to recognize the services and good reception which my father and myself, together and separately, have received during our long and often perilous travels in all the extent of the United States, as a mark of my lively gratitude, and also to contribute in that country to the extension and progress of agriculture, and more especially of sylviculture in the United States, I give and bequeath to the American Philosophical Society of Philadelphia, of which I have the honor to be a member, the sum of \$12,000; I give and bequeath to the Society of Agriculture and Arts in the State of Massachusetts, of which I have the honor to be a member, the sum of \$8,000; these two sums making 180,000 francs, or, again, \$20,000. I give and bequeath the sole ownership to these two abovesaid societies, and the usufruct to my wife for her life.

These bequests became available in 1870, and, while small from

present-day standards, have been, under intelligent administration, helpful along their intended lines.

PRIVATE FORESTRY.

Conditions in the United States concerning timber supplies and prices of forest products have been such that until within a few years the private practice of forestry methods has been well nigh impossible from a commercial standpoint. What has been done by private timber owners has been experimental and largely a labor of love. Even now there is a wide difference between the accepted methods of forest preservation or reforestation in the United States and those which have been practiced for centuries in Europe. There have been occasional attempts to follow literally the methods employed by European foresters, but it is becoming progressively clearer that the conditions existing in America are quite different from those to be found on the other side of the water. A history of the forestry movement in the United States, therefore, is not merely a continuation of the story of forestry with the scene of its early chapters laid in the woods of Germany and other foreign lands. It is American forestry in the strictest sense, because it is based on American conditions. The foresters of this country are working out their own salvation to a large degree; and, while the experiences of European foresters have been of great benefit to them, the conclusion has been reached that successful forestry in America must be American forestry—an invention, not an imitation.

In Germany, for example, the forest has been as carefully cultivated as would be a flower garden by a gardener, and undesirable growth has been eliminated, to the end that every tree should produce saw timber. This method has been feasible, not only when practiced by European governments, but by individual timber holders, because sale can be found for every scrap of material, while in the United States, up to a recent time, only the better quality of body timber was available. In Europe, therefore, the practice has prevailed of absolutely denuding the land and then replanting, while in the United States another plan is dictated by commercial conditions. In the case of the average American natural forest, at the utmost a quantity not exceeding one-third of the forest growth is worth removing, because of the size, character and kind of growth, or for other reasons. When, therefore, approximately only one-third of the forest is removed, there remains, under proper cutting methods, a vast quantity of valuable young growth which it would take from ten to seventy-five years to replace by the artificial

planting of trees or seed. The American method, or rather, the method most generally adopted by the foremost American foresters, is not the planting of trees in an open field as one would plant turnips, but rather a continuous selection and cutting of only mature timber, thus permitting the immature timber—which includes two-thirds of the ordinary American forest—to attain its growth.

The time will come when the European method will prevail in the United States, but it is not yet feasible on any large scale for the practice of individual owners.

However, the country has not been without those who have attempted with greater or less success the growing of timber. Perhaps the earliest attempt at conservative forestry was made by a private citizen. In Connecticut, in 1730, Jared Elliott, of Guilford, in partnership with Governor Bulkley and Mr. Livingston, of New York, started a small blast furnace at old Salisbury. The wood used in making the charcoal for the furnace was secured from the neighboring woodlands. Henry S. Graves, in telling of the efforts of these pioneers, who created a system of conservative forestry and of subsequent private forestry, says: "Instead of clearing the forests, as was usually done, a careful system of thinning was adopted. Only the large trees were cut, while the small specimens were left standing to shade the ground and to grow to a larger size. Tradition states that under this system the owners returned for successive crops every twenty years, and it is reported that timber is still being cut periodically from this same land."

A similar system of careful cutting is said to have been used by a large number of farmers in New England early in the last century, and the practice was, without doubt, inaugurated very soon after the country became thickly settled. Some farmers went further than simply to select with care the trees which they wished to use or sell, and made thinnings with the sole view of improving the remaining trees. Thus, it appears that, in 1840, B. F. Cutter introduced on his land at Pelham, New Hampshire, a system of improvement cuttings.

The planting of forest trees on waste lands was begun in Massachusetts at a very early period. It is said that between 1740 and 1750 an experiment in planting trees for ship timber was made at Pembroke, Massachusetts. Tradition relates that the plantation was a complete success, and that timber was cut from it about 1810. Another early plantation was made in Bristol County, Massachusetts, in 1790, where a farmer stocked a field with young oak by sowing it with acorns.

One of the first experiments in planting, of which there is record, was made in 1819 at Chelmsford, Massachusetts, where Rev. J. L. Russell transplanted a large number of pitch pine seedlings from a field, which he wished to cultivate, to a stretch of barren drift sand. He was much laughed at by his neighbors, but to their astonishment the trees flourished, and in twenty years he had a fine growth of pine, six to eight inches in diameter. Of still greater interest and value as an illustration is the plantation of Zacharias Allen, at Smithfield, Rhode Island, who planted about forty acres of waste land, in 1820, to oak, hickory and locust. The seed was sowed in plowed furrows on the smooth ground, and in rough places was dropped in holes made with a hoe or a similar implement. A careful account of all expenditures and receipts was kept, and at the end of fifty-seven years the books showed a profit of 6.92 percent on the capital invested.

Priestford farm, Harford County, Maryland, was the scene of an experiment in tree planting in 1822 which was eminently successful. Many similar plantations were made in early days, but in comparatively few cases have definite records been made and preserved. Among the best known of Massachusetts plantations are those of Richard Fay, at Linn, who planted about two hundred acres with oak, ash, maple, Scotch pine and larch, and of John F. Fay, who stocked about one hundred and twenty-five acres with trees.

The history of the prairie regions of the United States and of the earlier settled and cleared regions east of the Mississippi abounds with efforts at tree planting, mostly, however, for ornamental or protective purposes. The face of the country west of the Mississippi River, as far as the one hundredth meridian, has been changed by these plantings, which, for the most part, have had no definite commercial object in view. Within the last quarter of a century, however, successful experiments have been made in growing commercial timber in the West, by which it has been demonstrated that tree growing is not only theoretically possible but commercially practicable. Among the favorite trees are black walnut and hardy catalpa. Extensive experiments are being made by railroads, both east and west, in growing catalpa and locust as tie timber.

FORESTRY ASSOCIATIONS.

The public interest in the question of forestry, which at first was fostered by a comparatively few far-seeing men, was strengthened and stimulated by the manifest decrease in standing timber supply and the

enhanced value of forest products, so that for about thirty years there has been an accelerating movement under private auspices designed to awaken and educate the public in regard to forestry methods, and to further the cause of forestry as a national policy expressed through Congress, and for the proper protection of the timbered portion of the public domain. In this connection due credit should not fail to be given to the late J. Sterling Morton, Secretary of Agriculture from 1893 to 1897, who instituted in Nebraska in 1872 the annual Arbor Day, which institution has now come to be recognized by every state and territory. The tree planting which is a feature of Arbor Day has, perhaps, amounted to little, but the educative value of the observance of the day has been great, particularly in planting in the minds of the school children of the country the seed of ideas which will bear fruit as they come to citizenship.

The propaganda in favor of forest preservation for a long time made slow progress. Perhaps the first movement toward a national forestry association was in 1875 when a call was issued for a convention in Chicago. This association was organized in the following year at Philadelphia, but there its history practically ends. This attempt at organization doubtless grew out of the first effort to ascertain the forest resources of the United States, which was made by Professor F. W. Brewer in connection with the Ninth Census. In 1873 the American Society for the Advancement of Science had memorialized Congress and the state legislatures to "promote the cultivation of timber and preserve the forests" by proper legislation.

The American Forestry Congress, which afterward became the American Forestry Association, was organized at Cincinnati, Ohio, in 1882 through the influence of Baron von Steuben, chief forester of Germany. Doctor B. E. Fernow, subsequently Chief of the Forestry Division of the Department of Agriculture, was made secretary.

The subsequent fifteen years were largely years of preparation and education. The American Forestry Association, holding regular meetings annually and special meetings at other times in different parts of the country, has centered and organized all private efforts to advance the forestry movement. Its public proceedings form a library of technical and practical value to all students, not only of forestry but of the forestry movement. It publishes also a monthly journal called *Forestry and Irrigation*. The Association, which was incorporated in January, 1897, now has nearly 3,000 members, representing every state in the Union, Canada and foreign countries.

The objects of this Association are to promote :

1. A business-like and conservative use and treatment of the forest resources of this country;
2. The advancement of legislation tending to this end, both in the states and the Congress of the United States, the inauguration of forest administration by the Federal government and by the states; and the extension of sound forestry by all proper methods;
3. The diffusion of knowledge regarding the conservation, management and renewal of forests, the proper utilization of their products, methods of reforestation of waste lands, and the planting of trees.

The annual dues of the Association for regular members are \$2, which includes its official organ; for sustaining members, \$25. A life membership is secured on payment of \$100, requiring no further dues; while any person contributing \$1,000 to the funds of the Association is called a patron.

The officers of the American Forestry Association, chosen at the annual meeting held in Washington, District of Columbia, in 1905, are as follows :

President, Hon. James Wilson, Secretary of Agriculture; first vice president, James W. Pinchot, Washington, District of Columbia; recording secretary, Edward A. Bowers, New Haven, Connecticut; corresponding secretary, H. M. Suter, Washington, District of Columbia; treasurer, Otto Luebkert, Washington, District of Columbia. Directors, James Wilson, William L. Hall, Otto Luebkert, George P. Whittlesey, Henry S. Graves, B. E. Fernow, F. H. Newell, Gifford Pinchot, Edward A. Bowers, George K. Smith, William S. Harvey. Vice presidents, Sir Henri Joly de Lotbinière, Victoria, British Columbia; Charles C. Georgeson, Sitka, Alaska; John L. Kaul, Birmingham, Alabama; B. A. Fowler, Phoenix, Arizona; T. P. Lukens, Pasadena, California; W. G. M. Stone, Denver, Colorado; Austin F. Hawes, New Haven, Connecticut; Henry M. Canby, Wilmington, Delaware; John Joy Edson, Washington, District of Columbia; Elihu Stewart, Ottawa, Ontario; Charles H. Herty, Greencove Springs, Florida; R. B. Reppard, Savannah, Georgia; J. T. Pence, Boise, Idaho; Charles Deering, Chicago, Illinois; W. H. Freeman, Indianapolis, Indiana; Hugh P. Baker, Ames, Iowa; George W. Tinchler, Topeka, Kansas; S. C. Mason, Berea, Kentucky; Lewis Johnson, New Orleans, Louisiana; John E. Hobbs, North Berwick, Maine; Edward L. Mellus, Baltimore, Maryland; Alfred Akerman, Boston, Massachusetts; Filibert Roth, Ann Arbor, Michigan; Samuel B. Green, St. Anthony Park, Minnesota; William Trelease, St. Louis, Missouri; Charles E. Bessey, Lincoln, Nebraska; Frank W. Rollins, Concord, New Hampshire; John Gifford, Princeton, New Jersey; William F. Fox, Albany, New York; C. A. Schenck, Biltmore, North Carolina; William R. Lazenby, Columbus, Ohio; S. C. Bartrum, Roseburg, Oregon; William T. Little, Perry, Oklahoma; J. T. Rothrock, Westchester, Pennsylvania; George Peabody Wetmore, Newport, Rhode Island; George H. Whiting, Yankton, South Dakota; William L. Bray, Austin, Texas; Luke Lea, Nashville, Tennessee; George L.

Swendsen, Salt Lake City, Utah; George Aitken, Woodstock, Vermont; D. O. Nourse, Blacksburg, Virginia; Thomas L. Burke, Seattle, Washington; A. D. Hopkins, Morgantown, West Virginia; E. M. Griffith, Madison, Wisconsin; Joseph M. Carey, Cheyenne, Wyoming; William Little, Montreal, Quebec; George P. Ahern, Manila, Philippine Islands; William R. Castle, Hawaii; J. H. McLeary, San Juan, Porto Rico.

A notable development is the active interest taken by operating lumbermen in the affairs of the American Forestry Association and in the practical working out of the problems involved. For many years American lumbermen, for the most part, held aloof from the movement, largely owing to the impracticable theories promulgated by many of those most prominent in public discussion of the forestry question; but with the entrance into the work of men of education and practical ideas, and with the approach of the time when it will be possible to apply the principles of forestry to individual timber holdings, the forestry movement has come to have the support of multitudes of individual lumbermen and of organizations of lumber producers and timber owners.

Among the other societies concerned in the promotion of forestry are the International Society of Arboriculture, of which General William J. Palmer, of Colorado Springs, Colorado, is president; Henry John Elwes, F. R. S., of Colesborne, Cheltenham, England, vice president, and J. P. Brown, of Connersville, Indiana, secretary; and the Society of American Foresters, of which Gifford Pinchot, of Washington, District of Columbia, is president and George B. Sudworth, of Washington, District of Columbia, is secretary.

STATE FORESTRY WORK.

In the development of a forestry policy the general Government has had the moral assistance of nearly all of the states, and has profited by their successes and mistakes.

To Wisconsin belongs the honor of having created the first forest commission ever appointed by any of the states; but the first forestry association organized for the purpose of advancing state forestry interests was formed on January 12, 1876, in St. Paul, Minnesota, largely through the efforts of Leonard B. Hodges. This association was aided by state appropriations, which enabled it to offer premiums for the setting out of plantations, and also to publish and distribute widely the "Tree Planters' Manual." Revised editions are issued from time to time, the State aiding in the promotion of this missionary work.

MINNESOTA.

The great Hinckley forest fire of 1894 aroused the people of Minnesota to the necessity of forest protection and resulted in the enactment

of an excellent forest fire warden law which was approved in April, 1895. By its provisions township officials are ex-officio fire wardens. There is a chief fire warden who superintends the fire warden system and issues annual reports. Two-thirds of the expenses are borne by the county in which they are incurred, and the State pays the other one-third; but no county can expend under this law more than \$500.

This law has worked excellently. Notwithstanding some very dry and hazardous seasons, in which forest fires were numerous, the damage has been insignificant. The loss by forest fires in Minnesota, according to the reports of the fire wardens, has averaged only \$35,000 a year, while Minnesota forests, at a conservative estimate, are worth \$100,000,000. An estimate of the chief fire warden, based on reports, figures that, subsequent to settlement and previous to 1895, there was destroyed within the State \$4,232,000 worth of timber. It is estimated that there are in Minnesota 5,000,000 acres of land suitable only for growing timber. Minnesota has the Itasca State Park, of 19,000 acres (200 miles north of St. Paul), of which 7,600 acres were given by Congress on condition that the State would protect the timber, and 2,452 acres bought of the Northern Pacific Railway Company for fifty cents an acre. The park is well wooded with pine and other varieties of trees.

An act, approved April 28, 1904, was passed by Congress granting 20,000 acres of land to Minnesota for experimental forestry purposes. The lands selected are in a body a few miles north of Ely, in St. Louis County.

Wisconsin's first forest commission was appointed in 1867, but the results were not important. In 1893, however, a state forestry association was organized, which procured the passage of bills in the legislature providing for foresters in charge and giving the forest fire protection, and also issued circulars of instruction for settlers and farmers within the forest area of the State. In 1895 a fire law modeled on the Minnesota statute, but less effective in character, was passed. In 1897 a commission of inquiry, coöperating with the chief of forestry, did some work in this State, and in 1898 a new fire warden law was passed.

Maine appointed a board of commissioners in 1869, and in 1872 an act was passed encouraging tree-planting by granting a twenty-year tax exemption. In 1891 the state land agent was made forest commissioner. Since the enactment of the Maine forestry law in March, 1891,

Maine has suffered less from forest fires. An organization called the Maine Lumbermen & Land Owners' Association was formed at Bangor in February, 1896, with former Governor Davis, of Bangor, as president and Wilson Crosby, of Bangor, as treasurer.

NEW YORK.

New York has made more rapid and important progress in the solution of the forest problem than any other of the commonwealths of the Union. In 1872, by legislative enactment, there was instituted a state park commission, consisting of seven citizens with Horatio Seymour as chairman, which was instructed to make inquiries with the view to reserving or appropriating the wild lands lying northward of the Mohawk River, or so much thereof as might be deemed expedient for a state park. Finding that the State then owned only 40,000 acres in that region, the commission recommended a law forbidding further sales of state lands, and the retention of lands forfeited for the nonpayment of taxes.

In 1883 this recommendation was acted upon, at which time the State, through reversion of private lands by the nonpayment of taxes, had secured title to 600,000 acres. The following year the State Comptroller was authorized to employ experts to investigate and report a system of forest preservation. This commission of experts was composed of four and made a report in 1885. But the lumber interests of the State antagonized the proposed legislation. There was finally passed, however, a compromise bill entitled "An Act Establishing a Forest Commission, and to Define its Power, and for the Preservation of Forests."

The original forest commission was superseded in 1895 by the Commission of Fisheries, Game and Forests under a law passed April 25, of that year. Under this law the commission consisted of five members, and among its duties were the protection and preservation of forest reserves. This law of 1895 was a comprehensive measure, which proved extremely valuable in its workings.

In 1897 was passed an important act, which provided for a forest preserve board which was given power to secure for the State, by purchase or otherwise, such lands as it deemed advisable for the interests of the State, and giving it the power to exercise the right of eminent domain. Large amounts of land were purchased under this provision, so that at the present time the Adirondack Forest Preserve contains about 1,350,000 acres and the Catskill Preserve nearly 85,000 acres.

The Adirondack Forest Preserve is located within the Adirondack Park, which is a large district set apart in 1892 for the protection of the watershed of the Hudson and the other rivers of the State for public recreation and for the practical study of forestry. The area of the Adirondack Park is about 8,225,000 acres, of which the State owns not much over one-third.

The act of 1897 provided that the owner of land to be taken under the act might reserve the spruce timber ten inches or more in diameter, and the previous act provided that private owners who desired to have their lands included within the limits of the Adirondack Park should forever refrain from removing any timber except spruce, tamarack, or poplar twelve or more inches in diameter.

The commission now consists of one salaried and two unsalaried members, each holding office for four years. The commission employs thirty-two fish and game protectors and foresters at salaries of \$500 a year each, three forestry experts and a superintendent, Colonel W. F. Fox. New York has shown its purpose to preserve its forests by a single appropriation of \$1,800,000 to increase the area of its preserves.

The Louisiana Legislature passed an act in 1904 to establish a department of forestry to provide for the preservation of the forests, to prevent and suppress forest fires, and see to the reafforesting of denuded lands. It provides that the Registrar of the State Land Office shall be Commissioner of Forestry, with an addition of \$500 in salary. With him four other citizens, serving without compensation, constitute the State Forest Commission, which shall see to the administration of the act. The act provides for fire wardens in the various counties of the State and a chief fire warden to personally superintend forest-fire control, at a salary of \$500 a year and expenses. He is empowered to spend an amount not to exceed \$5,000 a year for fire control, as he sees fit, for fire patrol and prevention in other ways. The parish fire wardens are to receive \$2 a day for time spent in this work—two-thirds from their parish and one-third from the State. The fire wardens are empowered to call upon all citizens to assist them in times of fire or danger of fire. Willful, negligent, or careless setting of forest fires that cause injury are punishable by a fine of not over \$500, or imprisonment for not over ten years, or both.

The law further provides that leaving camp-fires unquenched, using combustible wads in firearms, or carrying naked torches in forests shall be punished, whether injury result or not, by a fine of not more than

\$100, or imprisonment for three months. The same penalties hold for defacing warning placards. Railroads are required to clear their right of way fifty feet on each side of their lines.

In New Hampshire commissions of inquiry were appointed at various times between 1881 and 1885 and between 1889 and 1893. Since the latter year there has been a permanent commission with a paid secretary who presents an annual report. In 1901 was organized a society for the protection of New Hampshire forests, which employed a forester. It is estimated that New Hampshire annually receives from 40,000 to 50,000 visitors, attracted by her mountain and forest scenery, leaving in the State from \$6,000,000 to \$8,000,000.

Little has been done in Vermont, although a commission existed from 1882 to 1884.

Massachusetts passed a law in 1882 encouraging municipal forests. In 1890 the State Board of Agriculture was instructed to report on forest conditions. There is a patriotic and efficient forestry association in the State.

California had a state board as early as 1885 and public power was delegated in 1887. The board passed out of existence in 1891. It issued altogether three reports, botanical in character, and established two experiment stations, which still exist as a part of the University of California. The entire coast range from San Francisco north was gone over by the State Board of Forestry during its life, the forests platted by sections and some very accurate maps prepared.

While Wisconsin deserves credit for having appointed the first forestry commission, Colorado deserves greater credit in the forestry movement, for it is the only state in the Union discussing forests in its constitution; and the State has not only endeavored to accomplish something, but has succeeded in passing favorable legislation. In 1885 it appointed a forestry commission and has maintained a department of forestry, fish and game since 1897. In 1901 the legislature passed a law licensing campers and hunters.

Pennsylvania has a forestry association which has edited *Forest Leaves* since 1886. A commission of inquiry was appointed in 1893 to report on watersheds on state lands and to employ a botanist, an engineer and a statistician. In 1895 a department of agriculture with a division of forestry was created, the division afterward becoming a department. Considerable forestry legislation was enacted in 1897, including an excellent fire law, a law providing for tax exemptions on

small tracts and an act establishing a state forest reserve by the purchase of three 40,000-acre tracts and of land delinquent for taxes. In March, 1892, the state reserves had reached an area of 325,000 acres. A forest ranger training school was established in 1903.

Kansas attempted to do something in 1887 by appointing a forestry commission. The net results are two state nurseries which distribute seedlings.

Michigan, in spite of occasional adverse legislation, has done some forestry work, beginning with 1887, when it organized its State Board of Agriculture and Forestry Commission. The legislature did not act upon its reports. Senator Charles A. Garfield succeeded in 1899 in securing the creation of a commission of three members which submitted a forestry bill at the session in 1901, but the bill failed of passage. The commission, however, was authorized to receive donations and to withdraw from sale 200,000 acres of state lands unfit for agriculture. Nearly all of the 6,000,000 acres of tax title lands in Michigan are cut-over lands. The forest reserve under the control of the state forest commission comprises all of the state land in three surveyed townships, amounting to about 35,000 acres. The law demands that these lands be protected, especially against fires; be improved by restocking denuded portions and by the promotion of forest growth generally; and be examined, to ascertain the agricultural lands. This practically prescribes the policy to be pursued by the forest commission and is the basis of all that thus far has been done. The commission has engaged forest rangers and one forester to watch over these lands, has planted 51,000 trees, established a tree nursery, begun a survey of lands in detail, established roads and trails, cleared lands, and is selling off and cleaning up the dead timber. A chair of forestry was established at the University of Michigan in 1893, with Doctor Filibert Roth in charge.

There has been spasmodic legislation in Ohio, and Ohio was, in a sense, the cradle of the forestry movement in the United States. As has been stated, the American Forestry Congress was organized in Cincinnati in 1882, the direct result of a visit to that city during 1881 by Baron von Steuben, chief forester of Germany. In 1883 out of this congress grew the Ohio State Forestry Association, which was instrumental in securing the appointment of a state bureau of forestry, which survived for six years and issued forestry reports in 1885, 1886 and 1887. The present forestry activities in Ohio are principally those of

the United States Bureau of Forestry and the Ohio State Experiment Station.

North Dakota appointed a commission of irrigation and forestry in 1890, but there has been no important legislation.

There has been a forester in North Carolina since 1891, attached to the Geological Survey. He has made three reports.

In New Jersey the Geological Survey has had an appropriation since 1894 for gathering forestry statistics. It has made three reports.

In West Virginia a bill was offered at the session of the legislature of 1897 for a forestry commission, providing for state preserves. No action has been taken.

Indiana appointed a state forestry board in 1900 and provided for a salaried forester. In this State a tax exemption on small tracts having 170 trees to the acre is effective. In 1903 state reserves of 2,000 acres and state nurseries were created.

Beyond the enactment of laws against the firing of woods and stock laws optional with the counties, Alabama has done little toward the permanent preservation of the forests.

There has been forest legislation in other states. Connecticut, Minnesota, New York and all the prairie states in the '70's began to urge forestry by granting bounties and exemptions from taxes on forest plantations. Pennsylvania and Wisconsin are prevented, by their constitutions, from making loans for the purpose of purchasing forest reserves.

Iowa has an association called the Iowa Park and Forestry Association which meets annually. At its last meeting the secretary of the association, Professor L. H. Pammel, made an exhaustive report of what the state college has done in planting, both for park and forestry purposes during the last thirty years, giving a list of the hardy trees, like the white pine, white spruce, red elm, Austrian pine, elm, Norway spruce, hemlock, hard maple, soft maple, red cedar and cottonwood, and giving accounts of their hardiness and adaptability to different conditions. The officers for 1905 are as follows: President, L. H. Pammel, of Ames; vice president, Wesley Greene, of Davenport; secretary, Professor Thomas H. MacBride, of Iowa City; treasurer, J. C. Monnett, of Iowa City. Executive committee: J. S. Trigg, of Des Moines; H. P. Baker, of Ames, and C. A. Mosier, of Des Moines. Legislative committee: C. L. Watrous, of Des Moines; B. Shimek, of Iowa City; Sidney Foster, of Des Moines; Bruce Fink, of Grinnell,

and Elmer Reeves, of Waverly. Committee on ways and means: Wesley Greene, W. A. Burnap, of Clear Lake; Eugene Secor, of Forest City. Committee on civic improvements: A. T. Erwin, of Ames; Silas Wilson, of Atlantic, and B. Shimek.

Virginia, North Carolina, South Carolina, Tennessee and Georgia have given their consent to the establishment of the proposed national forest reserve in the southern Appalachian Mountains, granting jurisdiction to the national Government to that end.

SCHOOLS OF FORESTRY.

Within the last few years the character of forest teaching has been revolutionized, so that at the present time an education in professional forestry is easily obtainable.

One of the earliest movements among the colleges to give a practical course in forestry was at the State University at Bozeman, Montana, in charge of Captain George P. Ahern, U. S. A., later in charge of the Philippine government forests. This course was discontinued, however, shortly after it began.

It may be said that the first effort at establishing practical educational work in forestry was attempted in 1898, when schools of forestry were established at Cornell University and at Biltmore. The New York Legislature of 1898 made provision for the establishment of a college of forestry in Cornell University, and provided for the purchase of a school forest of 30,000 acres to be used as an experimental demonstration area for illustrating the principles and practice of scientific forest management. The school was organized in April, 1898, with Dr. B. E. Fernow as director and dean.

The resources of the entire university, with its library, laboratories, museums and collections, were practically at the disposal of the college by the action of the board of trustees. Its first session opened in September, with the beginning of the collegiate year 1899. This was the first professional school of forestry established in America, which offered in its courses the same full complement of studies as are to be found in European institutions of similar kind. Cornell had begun to graduate students when the school was discontinued in 1903, owing to dissatisfaction of the State legislature with results, this dissatisfaction due largely to lack of appreciation of the purposes of the school and of the forestry methods employed.

Biltmore has an undergraduate course, covering one year, without vacation, which is doing good work in the cause of forestry, under the direction of C. A. Schenck.

The other institutions in the country which have given any attention to instruction in forestry heretofore have been the land-grant colleges of the several states. Of these, twenty-two have offered courses varying in length from a brief series of lectures to two full terms' work. These are the agricultural colleges of Alabama, Arkansas, Connecticut, Iowa, Idaho, Kansas, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, North Dakota, Ohio, Pennsylvania, Rhode Island, South Dakota, Texas, Vermont, Washington and West Virginia. Nine colleges touch upon forestry incidentally in connection with instruction in other branches, such as botany and horticulture, namely, those of Virginia, North Carolina, Georgia, Mississippi, Colorado, Oklahoma, Indiana and Maine. Ten institutions report no reference to the subject whatever. As to the character of the instruction in the courses in forestry, it varies greatly in the several institutions. The usual purpose is to give the students a general idea of the influence of forests upon climate and water flow and of forest geography, with more specific training in identification of trees and in propagation and planting.

It is evident that, considered as a part of a general course in agriculture, it is not feasible or desirable to make forestry the major subject, as is necessary in a technical school; but the brief courses offered in the agricultural colleges have been very successful in promoting public interest in forest protection and silviculture.

In 1895 there were introduced into Congress two bills providing for forestry education, one (H. R. 8389) providing an appropriation of \$5,000 to each of the agricultural colleges, to be devoted either to instruction or providing object lessons in the field; the other (H. R. 8390) providing for a post-graduate school—a national school of forestry—in connection with the Department of Agriculture and its Division of Forestry. No action beyond hearings before the Committee on Agriculture, to which the bills were referred, resulted.

One of the most complete forestry schools in the world is that at Yale, it having already graduated more professional foresters than all the other schools combined. The Yale Forest School offers a two-year graduate course, leading to the degree of master of forestry. The junior year begins in July, the first term being conducted at Milford, Pike County, Pennsylvania. Under the direction of the officers of this school a two months' popular course—July and August—also is conducted at Milford. Professor Henry S. Graves is the director.

This school owes its being to the philanthropy of Mr. and Mrs.

James W. Pinchot and their sons, Gifford and Amos R. E. Pinchot, who gave \$150,000 in 1900 for the establishment of a department of forestry at Yale University and a summer school of forestry at Gray Towers, the estate of J. W. Pinchot at Milford, Pike County, Pennsylvania. In 1903 Mr. and Mrs. Pinchot and their son, Professor Gifford Pinchot, added \$50,000 to the gift.

As it is now conducted, Marsh Hall is used as the central school building and is equipped with lecture rooms, a library and reading room, botanical and wood testing laboratories and drafting rooms. There is conducted a large amount of field work in Maltby Park, a forest of 400 acres, and at Gray Towers. At the latter place J. W. Pinchot has erected a number of valuable buildings for the use of the school. In addition, the students are given practical work in the lumber camps of Maine, New Hampshire, New York, Pennsylvania, the Carolinas, Michigan, Florida and Texas. The regular course embraces two years study and is designed to give the students a complete knowledge of American woods, as well as an understanding of forestry conditions in the island possessions of the United States.

The University of Michigan Forest School is part of the general department of literature, science and the arts. It has a two-year graduate course, leading to the degree of master of science in forestry. Professor Filibert Roth is the director.

Harvard University Forest School has a four-year undergraduate course in connection with the Lawrence Scientific School. R. T. Fisher is in charge of the curriculum.

The Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa, has a four-year course in forestry and horticulture, in which particular attention is paid to farm forestry, leading to the degree of bachelor of science. A course is also given adapted to students in the civil engineering department. H. P. Baker, assistant professor, is in charge of forestry.

University of Maine, Department of Forestry, Orono, Maine, has a four-year undergraduate course, leading to the degree of bachelor of science of forestry. Professor S. N. Spring is in charge of the department.

The Michigan Agricultural College, Department of Forestry, has a four-year undergraduate course, leading to the degree of bachelor of science. E. E. Bogue is professor of forestry.

The University of Minnesota has a forest school with a four-year

undergraduate course, leading to the degree of bachelor of science in forestry. Professor Samuel B. Green is in charge of the school.

The forest department of the University of Nebraska is connected with the Industrial College, Lincoln, Nebraska, and offers a four-year undergraduate course, leading to the degree of bachelor of science in forestry. Frank G. Miller is professor of forestry.

NATIONAL FOREST RESERVES.

The establishment of forest reserves as a settled policy of the United States dates from the act of Congress, approved March 3, 1891, which, in Section IV, granted the authority in these words:

The President of the United States may, from time to time, set apart and reserve, in any state or territory having public lands bearing trees, any part of the public lands wholly or in part covered with timber or undergrowth, whether of commercial value or not, as public reserves, and the President shall, by public proclamation, declare the establishments of such reserves and the limits thereof.

This, however, was not the first grant of authority for the establishment of forest reserves, for as early as 1799 Congress appropriated \$200,000 for the purchase of timber, or of lands on which timber was growing, suitable for the use of the navy, and for its preservation for future use. This was in the days of wooden vessels, when the preservation of timber suitable for vessel construction was considered essential, and in this step the young Republic but followed the example of the mother country, which for nearly two centuries had placed the broad arrow of the British admiralty upon pine suitable for masts and spars. Some small purchases were made on the Georgia coast under the provisions of this act, and on March 1, 1817, another act was passed renewing the act of 1799 under the following terms:

The Secretary of the Navy is authorized, under the direction of the President, to cause such vacant and unappropriated lands of the United States as produce the live oak and cedar timbers to be explored, and selections to be made of such tracts, or portions thereof, where the principal growth is of such timbers, as in his judgment may be necessary to furnish for the navy a sufficient supply of the same.

A subsequent act, in 1822, authorized the President to employ the land and naval forces of the United States in the protection of reserved timber or timber lands in Florida, and in 1831 penalties were provided for trespass. Under an act dated 1817 19,000 acres of land were reserved in Louisiana. There was a more general act, approved March 3, 1827, by which the President was authorized to take proper measures to preserve the live oak growing on the lands of the United States.

Under the various acts above mentioned nearly 25,000 acres of for-

est land were reserved in Georgia, Alabama, Florida, Louisiana and Mississippi.

Theoretically, the timber on all public lands was reserved, subject to certain exceptions. Thus, in 1878 an act was passed authorizing the citizens of Colorado, Nevada and the territories to fell and remove timber on the public domain for mining and domestic purposes, and another allowed the settler to take the timber necessary "to support his improvements." These were typical of numerous acts relating to this general subject and which were further modified or broadened by court decisions.

In addition to the timber reservations made for specific purposes prior to 1891, there are a number of national parks, the most important of which are in a wooded country, and all of which serve as forest preserves. The first great national park was the Yellowstone National Park, located in Montana and Wyoming, chiefly in the latter, on the headwaters of the Colorado River, established by act of March 1, 1872, and containing at the present time 2,142,720 acres, or 3,504.25 square miles. The act gave authority to the Secretary of the Interior to make such regulations as "shall provide for the preservation from injury or spoliation, of all timber, mineral deposits, natural curiosities or wonders, within the park and their retention in their natural condition."

Next in magnitude of the national parks is the Yosemite, which was established by an act of October 1, 1890. It covers 682,480 acres and includes the famous Yosemite Valley, of California. This park contains a large amount of timber.

Another important park is the Sequoia, established by act of September 25, 1890, and containing 160,000 acres. Near to it is the General Grant National Park, established by the same act, and containing 2,560 acres.

Both the Sequoia and the General Grant parks were established to preserve the bigtree groves within their boundaries.

Another national park which bears a large amount of timber is the Mt. Rainier, in Washington, established March 2, 1899, and containing 11,520 acres. It is entirely included within the boundaries of the Mt. Rainier Forest Reserve.

The Crater Lake National Park, established by act of May 22, 1902, contains 149,360 acres. It is located in Oregon and contains Crater Lake.

Other national parks of small area and of little, if any, timber value, are the Wind Cave National Park, established by act of January 9, 1903, and containing 10,560 acres, in South Dakota, twelve miles east of the

town of Hot Springs; Sullys Hill National Park, established by act of June 2, 1904, and containing 960 acres, on the south shore of Devil's Lake, South Dakota; Hot Springs Reserve, Arkansas, original act April 20, 1832, and containing 911.63 acres; Casa Grande Ruin, established act of March 2, 1899, executive order June 22, 1892, containing 480 acres, in Penal County, Arizona.

In addition to these national parks, and not included within the list of forest reserves, are numerous military reservations, some of considerable size and in timbered sections. One of the most interesting is the Mt. Whitney Military Reserve, in California. It contains about one hundred and forty square miles and includes within it the summit of Mt. Whitney, the highest peak in California.

The erection of forest reserves as a definite and permanent governmental policy was not the result, however, of hurried consideration.

Perhaps the first suggestion of such a policy appeared in 1876 with a bill (H. R. No. 2075) "for the preservation of the forests adjacent to the sources of navigable rivers and other streams," which never progressed farther than the pigeonhole of the Public Lands Committee.

Similar bills, introduced from time to time, experienced the same fate in the same or other committees, until more defined reservations were called for. An act to establish forest reservation on the headwaters of the Missouri and Columbia rivers passed the Senate in 1884, and again in 1885, but died in the House Committee; in the same year a general act providing for forest reservations was reported favorably in the House. After this, hardly a year passed without a number of legislative propositions to the same effect being introduced, the titles of the bills filling several quarto pages of the above-cited documents.

Hardly any kind of legislation which could be suggested was overlooked, from the creation of forest commissions to investigate the subject to providing for fully organized forest administrations and the establishment of forestry schools.

The American Forestry Association presented a comprehensive bill drawn by the Chief of the Forestry Division in 1888, providing for the withdrawal from entry or sale of all public timber lands not fit for agricultural use, and for their proper administration under technical advice. (S. 1476 and S. 1770, 50th Cong. 1st sess.)

Modifications of this bill were introduced from year to year, and their enactment urged, but with small success.

Finally, in the Fifty-first Congress, through the earnest insistence

of Secretary of the Interior John W. Noble, who was fully imbued with the necessity of some action such as was advocated by the Association, the following section was added to the act entitled "An Act to Repeal Timber Culture Laws, and for Other Purposes," approved March 3, 1891:

Sec. 24. That the President of the United States may, from time to time, set apart and reserve, in any state or territory having public lands bearing forests, any part of the public lands wholly or in part covered with timber or undergrowth, whether of commercial value or not, as public reservations, and the President shall, by public proclamation, declare the establishment of such reservations and the limits thereof.

It is upon this feeble "rider," attached to a bill hardly germane to the subject, that the forest reservation policy of the Federal government is based, and that the federal land policy, which before considered only disposal of the public domain, was changed, the Government becoming a land owner in perpetuity.

Acting upon this authority, the President established seventeen forest reservations, with a total estimated area of 17,500,000 acres previous to 1894. These reservations were established usually upon the petition of citizens residing in the respective states and after due examination, the forestry association acting as intermediary.

Meanwhile, the legislation devised for the administration of the forest reserves, existing or to be established (H. R. 119), specially urged by Representative McRae, chairman of Public Lands Committee, failed to be enacted, although in the Fifty-third Congress it was passed by both houses, but failed in conference. Forest reservation without forest administration threatened to make the whole policy unpopular.

Urged by the committee of the Forestry Association, which hoped to secure thereby potent influence for the proposed legislation, Secretary Hoke Smith, of the Department of the Interior, impressed with the importance of devising some adequate system of protection and management of the forests, both within the reserves and in the public domain, under date of February 15, 1896, requested the National Academy of Sciences, the legally constituted adviser of the Government in scientific matters, to investigate and report "upon the inauguration of a rational forest policy for the forested lands of the United States."

Under date of February 1, 1897, the academy submitted to Secretary Francis a preliminary report recommending the creation of thirteen additional forest reserves with a total area of 21,379,840 acres, the avowed purpose being, by radical action, to bring the matter to a head.

These reserves were proclaimed as recommended, without examination, by President Cleveland, February 22, 1897. On May 1, 1897, the president of the academy submitted his complete report (Senate Doc. No. 105), recommending substantially the legislation so long urged by the Forestry Association.

A storm of indignation broke out in Congress over the precipitate action of the President, the repeal of the entire forest reservation policy was demanded by the western senators and representatives, who felt insulted by the lack of consideration, and the laboriously achieved first step threatened to be lost. A compromise was, however, effected.

The sundry civil appropriation bill passed June 4, 1897 (see Senate Doc. No. 102), set aside the proclamations of February 22, 1897, suspending the reservations which were made upon the recommendation of the committee of the academy until March 1, 1898, ostensibly to give time for the adjustment of private claims and more carefully to delimit the reservations. For this purpose an appropriation of \$150,000 to survey the reservations under the supervision of the Director of the Geological Survey was made. The provisos attached to this appropriation embody the most important forestry legislation thus far enacted by Congress. These provisos had been in the main formulated in the above-cited bill known as the McRae bill, which was passed by the House of Representatives and the Senate of the Fifty-third Congress, without, however, becoming a law; and again had passed the House in the Fifty-fourth Congress, it being the legislation advocated by the American Forestry Association as a first step toward a more elaborate forest administration of the public timber lands. Excluding minor items, the law provides that:

All public lands heretofore designated or reserved by the President of the United States under the provisions of the act approved March third, eighteen hundred and ninety-one, the orders for which shall be and remain in force and effect, unsuspended, and unrevoked, and all public lands that may hereafter be set aside and reserved as public forest reserves under said act, shall be as far as practicable controlled and administered in accordance with the following provisions:

No public forest reservation shall be established, except to improve and protect the forest within the reservation, or for the purpose of securing favorable conditions of water flow, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States; but it is not the purpose or intent of these provisions or of the act providing for such reservations to authorize the inclusion therein of lands more valuable for the mineral therein or for agricultural purposes than forest purposes.

For the purpose of preserving the living and growing timber and promoting

the younger growth on forest reservations, the Secretary of the Interior, under such rules and regulations as he shall prescribe, may cause to be designated and appraised so much of the dead, matured, or large growth of trees found on such forest reservations as may be compatible with the proper utilization of the forests thereon, and may sell the same for not less than the appraised value in such quantities to each purchaser as he shall prescribe, to be used in the state or territory in which such timber reservation may be situated, respectively, but not for export therefrom. . . . Such timber, before being sold, shall be marked and designated, and shall be cut and removed under the supervision of some person appointed for that purpose by the Secretary of the Interior, not interested in the purchase or removal of such timber, nor in the employment of the purchaser thereof. . . .

Upon the recommendation of the Secretary of the Interior, with the approval of the President, . . . any public lands embraced within the limits of any forest reservation which, after due examination by personal inspection of a competent person appointed for that purpose by the Secretary of the Interior, shall be found better adapted for mining or for agricultural purposes than for forest usage, may be restored to the public domain. And any mineral lands in any forest reservation which have been or which may be shown to be such, and subject to entry under the existing mining laws of the United States and the rules and regulations applying thereto, shall continue to be subject to such location and entry, notwithstanding any provisions herein contained.

The law authorized the Secretary of the Interior to permit the use of timber and stone by bona fide settlers, miners, etc., for firewood, fencing, buildings, mining, prospecting and other domestic purposes. It protected the rights of actual settlers within the reservations, empowered them to build wagon-roads to their holdings, enabled them to build schools and churches, and provided for the exchange of holdings for allotments outside the reservation limits.

Under the above enactment the commissioner of the General Land Office formulated rules and regulations for the forest reservations, and a survey of the reserves was begun by the United States Geological Survey, the appropriations for such a survey having been continued from year to year, and the date for the segregation of agricultural lands and their return to the public domain open for entry having been deferred.

Under this reorganization of the management of forest reserves rapid progress was made. Both President Cleveland and President McKinley were ardent advocates of the reserve policy and set aside large areas of public lands for this purpose.

With the purpose of the reserves clearly defined by statute and the rights of settlers and the needs of growing communities being provided

for, the popular opposition rapidly subsided until, in 1905, practically all opposition had ceased, complaints being confined almost entirely to details, such as the inclusion within reserves of sections or townships in regard to whose character some might differ from the conclusions of the experts of the forest service. These complaints, however, covered small areas and little, if at all, affected the general policy and practice of the Government.

In the act of March 3, 1901, it was provided that forest agents, superintendents and supervisors and other persons employed under the appropriation made upon that date in execution of the provisions of the act of June 4, 1897, should be selected by the Secretary of the Interior only with reference to their fitness and without regard to their political affiliations; it also provided that such employees of the department should aid in the enforcement of the game and fish laws of the state in which the reserves were located.

As time went on it became more plainly evident that so immense a business enterprise as the administration of the forest reserves should be more centralized than had been the case. The reserves had been, until 1905, under the exclusive control of the Department of the Interior, notwithstanding that there existed in the Department of Agriculture a bureau of forestry whose province was to make a special study of all such subjects as would arise in connection with the administration of the forest service. The interior department had the forests and the agricultural department the foresters. The American Forest Congress, held at Washington, District of Columbia, January 2 to 6, 1905, under the auspices of the American Forestry Association, recognized the anomalous conditions and one of the most important acts was the adoption of the following resolution:

Resolved, That we heartily approve the movement for the unification of all the forest work of the Government, including the administration of the national forest reserves, in the Department of Agriculture, and urge upon Congress the necessity for immediate action to that end.

It also adopted resolutions recommending the repeal of the Timber and Stone Act and the passage of an act as a substitute therefor which should confer authority to sell timber growing on the public lands when such sale should be for the public welfare, and also an amendment or repeal of the lieu land law, so that lieu selections should be confined to lands of equivalent value and similar conditions as regards forest growth; also that the law which prohibited the export of forest reserve timber

from the state in which it was grown should be repealed so far as concerned the states in which the export of such timber would be to the public interest; also the passage of a law which would authorize the sale of all nonmineral products of the forest reserves, all proceeds of such sales to be applied to the maintenance of the reserves.

These recommendations bore some immediate fruit, the principal one, recommending the unification of the forest work of the Government, being passed by Congress and signed by President Roosevelt, February 1, 1905. It was in the following terms:

The Secretary of the Department of Agriculture shall, from and after the passage of this act, execute, or cause to be executed, all laws affecting the public lands heretofore or hereafter reserved under the provisions of Section XXIV of the act entitled "An Act to Repeal the Timber Culture Laws and for Other Purposes," approved March 3, 1901, and an act supplementary thereto and amendatory thereof, after such lands had been so reserved, respecting such laws as affected the surveying, locating, appropriating, entering, relinquishing, conveying, or patenting of any such lands.

Thus, while title and all necessary duties and rights relating thereto remained with the interior department, the management of the forest reserves, as such, was concentrated in the Department of Agriculture as represented by the Bureau of Forestry, which, after July 1, was, by the agricultural appropriation act of March 3, 1905, for the fiscal year ended June 30, 1906, erected into the "Forest Service," to begin with July 1, 1905.

This act provided for the general expenses of the forest service—"the expenses necessary to protect, administer, improve and extend the national forest reserves." It gave police power to all persons employed in the forest reserves and national park service in support of the laws and regulations relating to them and, further, granted power to the Department of Agriculture in the following terms:

And the Secretary of Agriculture may, in his discretion, permit timber and other forest products cut or removed from the forest reserves of the United States, except the Black Hills Forest Reserve, in South Dakota, and the forest reserves in Idaho, to be exported from the state, territory, or the District of Alaska, in which such reserves are respectively situated—for the employment of local and special fiscal and other agents, clerks, assistants and other labor required in practical forestry, in the administration of forest reserves, and in conducting experiments and investigations in the city of Washington and elsewhere; and he may dispose of photographic prints at cost and ten per centum additional, and other property or materials under his charge in the same manner as provided by law for other bureaus; for collating, digesting, reporting, illustrating and printing the results of such experiments and investigations; and for the purchase of all necessary supplies, apparatus and office fixtures; for freight and express charges and traveling and other necessary expenses.

Thus full power was granted to the agricultural department to conduct the forest reserves on such a business basis as might appear to be for the benefit of the people.

Another act, of March 3, 1905, was entitled "An Act to Prohibit the Selection of Timber Lands in Lieu of Lands in Forest Reserves."

The forest reserve and preservation policy of the United States, to sum it up, now includes the right of the President to withdraw from entry and sale any part of the public domain and to erect the same into forestry reserves when, in his judgment, the interests of the districts where such domain is located, and of the people at large, will be subserved thereby. Ample provision is made for the care of the preserves and, under an efficient forest service, well provided with money, opportunity is afforded for scientific and practical development of the forest reserves contained within them. Mature timber can be sold and planting can be undertaken if desirable. Abuses of the reserves are done away with. They are guarded against depredations by cattle, sheep and men, and fire is, as far as practicable, forestalled.

There is no intention definitely to withdraw the timber within the reserves from public use. It can now be used when immediate necessity arises and can be sold for the support of the lumber industry when it is needed for that purpose and when market conditions warrant.

FOREST RESERVES IN 1905.

Since the adoption of the forest reserve act of March 3, 1891, the presidents of the United States have been earnest advocates of the forest reserve policy and, consequently, progress in setting aside reservations has been rapid. Within two years after the act went into effect seventeen reservations were set aside under executive order, having a total area of 17,564,800 acres. The first was the Yellowstone National Park Timber Land Reserve, in Wyoming, which has ceased to exist as such. The second was the White River Plateau Reserve, in Colorado. The third the Pecos Forest Reserve, in New Mexico, the fourth the Sierra, in California, and the fifth the Pacific Forest Reserve, in Washington. These have been largely modified or included in other reserves since that time.

Under the administration of President Theodore Roosevelt there was extensive enlargement and increase in the number of reserves, though some have decreased in area, to adapt them, individually, to the conditions of the localities in which they are situated. On September 15, 1905, there existed eighty-six forest reserves, created by presidential proclamation, embracing 88,344,541 acres.

FORESTRY AND FOREST RESERVES.

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The following is a list of the reserves, the state or territory in which each is located, and the date of its establishment, or on which its boundaries were changed, and its estimated area on the above date. The list contains, therefore, an outline history of the executive action in carrying forward the forest reserve policy of the National government. It is as follows:

FOREST RESERVES, SEPTEMBER 15, 1905.

STATE OR TERRITORY.	Name of Reserve.	Date of proclamation creating reserve or changing boundary thereof.	Present estimated area.
			Acres.
Alaska	Afognak Forest and Fish Culture Reserve.....	Dec. 24, 1892	408,640
Alaska	The Alexander Archipelago Forest Reserve....	Aug. 20, 1902	4,506,240
Arizona.....	Grand Canyon Forest Reserve.....	{ Feb. 20, 1893 May 6, 1905 }	2,307,520
Arizona.....	The San Francisco Mountains Forest Reserve..	{ Aug. 17, 1898 April 12, 1902 }	1,975,310
Arizona.....	The Black Mesa Forest Reserve.....	{ Aug. 17, 1898 May 10, 1898 }	1,658,880
Arizona.....	The Prescott Forest Reserve.....	{ May 10, 1898 Oct. 21, 1899 }	423,680
Arizona.....	The Santa Rita Forest Reserve.....	Apr. 11, 1902	387,300
Arizona.....	The Santa Catalina Forest Reserve.....	July 2, 1902	155,520
Arizona.....	The Mount Graham Forest Reserve.....	July 22, 1902	118,600
Arizona.....	The Chiricahua Forest Reserve.....	July 30, 1902	169,600
Arizona.....	Pinal Mountains Forest Reserve.....	Mar. 20, 1905	45,760
California	San Gabriel Timber Land Reserve.....	Dec. 20, 1892	555,520
California	Sierra Forest Reserve.....	{ Feb. 14, 1893 July 25, 1905 }	5,375,890
California	San Bernardino Forest Reserve.....	{ Feb. 25, 1893 Feb. 25, 1893 }	737,280
California	The Trabuco Canyon Forest Reserve	{ Feb. 25, 1893 Jan. 30, 1899 }	109,920
California	The Stanislaus Forest Reserve	Feb. 22, 1897	691,200
California	The San Jacinto Forest Reserve	Feb. 22, 1897	668,160
California	The Lake Tahoe Forest Reserve.....	Apr. 13, 1899	136,335
California	The Santa Barbara Forest Reserve.....	Dec. 22, 1903	1,838,323
California	The Modoc Reserve.....	Nov. 29, 1904	288,218
California	The Warner Mountains Reserve.....	Nov. 29, 1904	308,518
California	The Plumas Reserve.....	Mar. 27, 1905	579,520
California	The Klamath Reserve.....	May 6, 1905	1,896,313
California	The Lassen Peak Reserve.....	June 2, 1905	897,115
California	The Trinity Reserve.....	Apr. 26, 1905	1,243,042
California	Diamond Mountain.....	{ July 14, 1905 Oct. 16, 1891 }	626,724
Colorado.....	The White River Forest Reserve	{ June 28, 1902 May 21, 1904 }	978,880
Colorado.....	Pikes Peak Timber Land Reserve.....	{ Feb. 11, 1892 Mar. 18, 1892 May 12, 1905 }	1,681,667
Colorado.....	The Battlement Mesa Forest Reserve.....	{ Dec. 24, 1892 May 16, 1904 June 5, 1905 }	797,720
Colorado.....	The San Isabel Forest Reserve.....	{ Apr. 11, 1902 June 12, 1905 }	321,227
Colorado.....	The Gunnison.....	May 12, 1905	901,270
Colorado.....	The Leadville Reserve.....	May 12, 1905	1,219,947
Colorado and Wyoming	The Medicine Bow Forest Reserve.....	{ May 22, 1902 July 19, 1902 May 17, 1905 }	1,576,493
Colorado.....	The San Juan Reserve.....	June 3, 1905	1,437,408
Colorado.....	Park Range.....	June 12, 1905	757,116
Colorado.....	Wet Mountains.....	June 12, 1905	239,621
Colorado.....	Cochetopah.....	June 13, 1905	1,133,330
Colorado.....	Montezuma.....	June 13, 1905	576,719
Colorado.....	Uncompahgre.....	June 13, 1905	478,111
Colorado.....	Holy Cross.....	Aug. 25, 1905	990,720
Idaho.....	The Pocatello Forest Reserve.....	Sept. 5, 1903	49,920
Idaho and Montana	The Bitter Root Forest Reserve.....	{ Feb. 22, 1897 June 14, 1904 May 22, 1905 }	4,552,880

¹Even sections only.

Few who have not taken pains to inform themselves about the matter have any idea of the extent of the forest reserves belonging to the United States. The more than eighty-eight million acres covered by the above named reserves can best be appreciated by some graphic illustrations. Their area is, approximately, equivalent to a tract of land 200 miles wide reaching from New York to Chicago, or, it is in excess of the combined areas of Ohio, Indiana and Illinois. The reserves contain more than three times the area of the great State of Pennsylvania, and more than any one state or territory in the Union, except Texas, California and Montana. The forest reserve area is 4.4 percent of the entire area of the United States. The reserves within the State of California are 16 percent of its area, in Washington 18 percent and in Oregon almost 10 percent. In the above percentages the area of the two Alaska reserves has been excluded from the calculation. These reserves are the Afognak Forest and Fish Culture Reserve, consisting of Afognak Island, located to the east of the base of the Alaska Peninsula and north of Kadiak Island, and practically marking the extreme western limits of the forests of North America, and the Alexander Archipelago Forest Reserve. The latter occupies the southeastern islands of Alaska, which are, for the most part, densely covered by forests, including a large amount of timber of commercial value, although authorities disagree as to the precise character of the timber in this particular. Statements have been made that the forests compare with those of British Columbia and Washington; but better information leads to the conclusion that the growth is smaller and less perfect, and will not come into requisition as a source of supply for the lumber markets until the more southern timber supplies are greatly depleted.

The purpose of the forest reserves is two-fold. First, to perpetuate for the benefit of the United States a supply of timber, and, second, to protect the water supply of arid, or semiarid regions. Some reserves, like those of Washington and Oregon, are primarily for the first-named purpose, others, like those of southern California, Arizona, New Mexico, Colorado, Wyoming and Montana, are primarily for the second purpose.

Space does not permit a detailed description of all the reserves, but from the reports of the Geological Survey, which has in charge the examination and mapping of the reserves, may be taken descriptions of the timber of certain typical reserves, which will serve the double object of outlining their general character and purpose and of indicating

the timber species and stands of timber in the sections of which they are typical.

SAN FRANCISCO MOUNTAINS FOREST RESERVE.

In Arizona the most important reserve is the San Francisco Mountains Forest Reserve, with its area of nearly two million acres, occupying portions of the broad summit and the slopes of the elevated tract of land in north central Arizona, the altitude ranging from 3,500 feet to 12,794 feet at the summit of San Francisco Peak.

This region may be regarded as an extension southward of the Colorado Plateau. This reserve contains twelve species of coniferous trees and nearly the same number of broad-leaved trees. The chief timber of the reserve is the western yellow pine (*Pinus ponderosa*). It is estimated to constitute 99 percent of the merchantable timber on the reserve, and about 90 percent of the total forest, and it grows at elevations between 6,200 and 8,500 feet. Above the yellow pine zone come the red fir, limber pine, aspen and scattering Engelmann spruce. Below the yellow pine belt there is a scanty forest of semiarid species of little or no commercial value, of which the one-seed juniper and the piñon are the most prominent.

The reserve is estimated to contain an average of 3,377 feet board measure an acre, the uncut yellow pine in its best development on a considerable area measuring 10,000 feet and upward per acre. Portions of this reserve, especially within the limits of the yellow pine belt, are valuable for their timber stands and for the possibilities of their forest reproduction, but upon the water flow from the reserve depends, in a large measure, the welfare of potentially rich agricultural districts.

BATTLEMENT MESA FOREST RESERVE.

The Colorado reserves are typical of those of Utah, Wyoming, New Mexico and Arizona, as well as of Colorado itself.

The Battlement Mesa Forest Reserve lies south of Grand River, east of the lower Gunnison River. Its area is 797,720 square miles. Its commercial species of timber are the Engelmann spruce, Alpine fir, red fir (*Pseudotsuga taxifolia*), blue, or parry, spruce, yellow pine (a variety of the *Pinus ponderosa*), one-seed juniper and Rocky Mountain juniper. The deciduous species are nine or ten in number, of no commercial value, except possibly in the case of the aspen; a few of the others, like the Rocky Mountain oak, the service berry and the narrow-leaf cottonwood, being of some value for domestic use. In this reserve the Engelmann spruce and the Alpine fir are the most conspicuous and

abundant timbers, and where the two kinds are represented the spruce forms 70 to 75 percent of the entire stand. This species ranges between 8,000 and 10,000 feet in elevation. No estimates are made as to the total stand of timber or average per acre on this reserve, but it is extremely small. None of the trees on this reserve grow to large sizes. The extreme dimensions of the spruce are from forty to sixty feet in height and from six to fourteen inches in diameter. The Alpine fir reaches a somewhat greater height. The remaining coniferous species are of comparatively small commercial value.

PIKES PEAK FOREST RESERVE.

Somewhat different are the characteristics of the Pikes Peak Forest Reserve, which occupies 1,681,667 acres in central Colorado, on the eastern outposts of the Rocky Mountains. Tree species within this reserve include five species of pine, two of spruce, two of fir, the red fir, two of cedar, one of oak and four of poplar. The most abundant and most valuable species of the pine is the *Pinus ponderosa*, the western yellow pine. It reaches an extreme diameter of four feet and a height of 125 feet, with an average of between one and two feet in diameter and seventy-five feet in height. The pine of second importance is the lodgepole pine (*Pinus murrayana*). The pine which ranges third in value is the *Pinus aristata*, known as range, or pitch, pine. Other pines are the limber pine and piñon. The red fir is abundant in this reserve, growing to a diameter of four feet or more, and to a height of over 100 feet, but with an average diameter and height very much less. The Engelmann spruce, or white spruce, is a less abundant tree, but furnishes saw timber at elevations between 10,000 and 11,500 feet. No estimates of the total timber stand of the reserve have been made, but extensive compact forests formerly existed at altitudes above 8,000 feet. Pikes Peak Reserve is typical, in great measure, of the forests of the eastern ranges of the Rockies from Montana south.

LEWIS AND CLARK FOREST RESERVE.

A reserve typical of the northern Rocky Mountain region is the Lewis and Clark Reserve, of Montana, which now contains 4,670,720 acres. In 1899 the reserve, which as then constituted contained but 2,926,000 acres, was carefully examined by the Geographical Survey. It then occupied the whole breadth of the Rocky Mountains, except the western slope of Mission Range, and included four parallel ranges, the principal streams including the Middle Fork of Flathead River, the South Fork of Flathead River, the North Fork of Blackfoot River, the

Sun River, the North Fork of Dearborn River and the Swan River. Flathead Lake is to the west of it, and the city of Missoula a short distance south. The country is extremely rugged and the tree growth is almost entirely of the mountain type. The examination showed an average of only a little more than 900 feet of merchantable timber to the acre.

The trees listed as growing within the reserve are eighteen in number, of which five are pines, two are spruces, two are larches, two are firs, one is red fir, one is cedar, two are hemlock and three are poplars. The most abundant tree is the larch, the next being the red fir, then the spruce and the yellow pine and the lodgepole pine. The total estimate of timber in the reserve was 2,644,360,000 feet.

Worthy of special note in connection with this reserve are the limited number of tree species of sufficient account to enter into the examination, and the sparse distribution of the timber, the best of it being found in the valleys which are between 3,000 and 5,000 feet in altitude, the pines of the main ranges lying between 7,000 and 10,000 feet. The timber is, for the most part, defective, even the yellow pine being of inferior character. The lodgepole pine (*Pinus murrayana*), while small, is usually straight and sound. The most useful tree is the Engelmann spruce. The red fir attains a size of three feet in diameter and 100 feet in height, but is a victim of dry rot.

THE OLYMPIC FOREST RESERVE.

The quantity and quality of the timber in the northwestern part of the United States generally improves to the westward from the summits of the Rockies, except in the great interior arid basin. The Priest River Reserve in northern Idaho and northeastern Washington is of decidedly better character than the Montana reserves, though the Bitter Root Reserve, in southwestern Montana and southeastern Idaho, is of better character than the others in Montana. It is when we come to the reserves situated on the Cascade Mountains, or west of them, that we find the heavy and valuable timber. The most notable of any of the reserves in this respect is the Olympic Forest Reserve, which occupies the principal portion of the Olympic Peninsula in northwestern Washington, lying between Puget Sound and the Ocean, and bounded on the north by the Strait of Juan de Fuca. This reserve occupies 1,466,880 acres. It was the subject of a monograph issued by the United States Geographical Survey in 1902.

The reserve includes the Olympic Mountain group with its slopes toward the east, north and south, together with the long slope to the west and a considerable extent of the lowland bordering the Pacific Coast. The Olympics are a group of mountains of nearly circular shape, the central mass of which culminates in Mount Olympus, with an altitude of 8,150 feet, while many other summits rise to altitudes ranging between 7,000 and 8,000 feet, and large areas lie above timberline, which in this locality has an altitude of 5,500 to 6,000 feet. This mountain mass is drained by many rivers which radiate in all directions from the interior of the tangle of mountains.

Taken as a whole it is probably the most heavily forested region of Washington and, with a few exceptions, of the country. The densest forests are found in the townships near the Pacific Coast and in the southern tier of townships. The examination referred to covered 3,483 square miles, of which 83 percent carried commercial timber, 5 percent had been burned, 8 percent consisted almost entirely of Alpine meadows and was naturally timberless, and 4 percent of rock and ice. It was estimated that the timber of the reserve amounted, on the basis of the estimate used, to 60,998,250,000 feet, or 25,570 feet board measure to the acre, while of the timbered area of the reserve the estimate was about 33,000 feet an acre. The red fir comprised 24 percent of the entire timber stand; the cedar, 10 percent; the hemlock, 42 percent; the spruce, 6 percent, and the lovely fir (*Abies amabilis*) 18 percent. The above percentages are approximates only, for there are other trees which are of minor importance. These are the Alpine fir, found only on the higher parts of the mountains; the white pine (*Pinus monticola*); the Alaska cedar; the Sitka spruce, found only in the neighborhood of the Pacific Coast; the vine maple, a small tree of no commercial value; the maple (*Acer macrophyllum*), a fine bottom land tree; the madrona, seldom more than twelve inches in diameter, and a species of cottonwood, which sometimes grows to a diameter of five feet.

CASCADE RANGE FOREST RESERVE.

While in Washington there are two other great reserves, the Washington and the Mount Rainier, each exceeding the Olympic in size and both carrying large quantities of timber and including in their area a large percent of the timber resources of the State, space forbids their description. Substantially similar in character, however, is the Cascade Range Forest Reserve, of Oregon, which contains 4,436,120 acres. This reserve occupies the summit of the Cascade Range from the

Columbia River on the north southward nearly to the California boundary, and extending a greater or less distance over both the western and eastern slopes of the main range. The range has an average altitude of about 8,000 feet, though upon its crest stand numerous extinct volcanoes which rise much higher. Mount Hood, on the north, rises to 11,225 feet above the sea; Mount Jefferson, 10,350 feet; Mount Washington, 8,500 feet; the Three Sisters, from 10,000 to 10,500 feet; Mount Thielsen, 9,250 feet; Mount Pit, 9,760 feet. It is estimated that about 85 percent of the land in reserves is forested; 8 percent has been burned; 5 percent is open country, and that only 2 percent consists of mountainous rocks and ice, of water surface or of cultivated land. The total timber upon the reserve is estimated at over 50,000,000,000 feet or about one-fourth of the entire standing timber of Oregon. This gives an estimate of 10,240 feet board measure as the average stand per acre, all classes of lands being included.

The most important timber tree of the Cascade Range Forest Reserve is the red fir (*Pseudotsuga taxifolia*), furnishing 54 percent of the commercial timber. Next in importance is the western hemlock (*Tsuga heterophylla*); next is the Patton hemlock, or spruce, (*Tsuga mertensiana*); next the yellow pine (*Pinus ponderosa*); next the noble fir; next the lovely fir, and next the tamarack. Altogether there are more than twenty tree species listed within the reserve, of which the only deciduous trees are Pacific oak, cottonwood, aspen, Oregon maple, chinquapin and alder. The firs, pines and hemlocks are estimated to comprise 95 percent of all the timber, three-fourths of which is found west of the summit of the range. Among the trees sparingly represented, but which are characteristic of the region, are Engelmann spruce, incense cedar, white pine, (*Pinus monticola*) lodgepole pine, sub-alpine fir, sugar pine, and a juniper.

The following table shows the percentage of trees which grow in sufficient quantity to make up some appreciable percentage of the whole:

Red fir.....	54 percent.	Lodgepole pine.....	1 percent.
Noble fir.....	6 percent.	Red cedar.....	2 percent.
Lovely fir.....	4 percent.	Patton hemlock.....	9 percent.
White fir.....	2 percent.	Western hemlock.....	11 percent.
Yellow pine.....	7 percent.	Tamarack.....	3 percent.
White pine.....	1 percent.		

One of the most important trees of the Pacific forests is the sugar pine, but it does not figure largely in the Cascade Range Forest Reserve for the reason that its northern limit of typical growth is found near the southern limit of the reserve.

THE YOSEMITE FOREST.

Great variety is to be found in the distribution and density of growth on the forested mountain regions of California. The heavy timber extends along the Sierra Nevadas from the northern boundary of the State well toward the San Bernardino Mountains in the south. Yellow pine, sugar pine and fir are the valuable trees of the northern Sierras, while on the Coast Range near the ocean is found the redwood. Located near the central part of the State is the Yosemite National Park, adjoining which, on the north, is the Stanislaus Forest Reserve and south of it the great Sierra Forest Reserve.

An examination of the Yosemite quadrangle, made in 1899, is interesting as showing the conditions in one of the most heavily timbered sections of the Pacific Coast. This quadrangle contains 954 square miles, or 610,560 acres. It is estimated that the total stand of the timber is about 10,000,000,000 feet, or about 16,350 feet per acre for the entire area. It is estimated that 284 square miles maintain an average of 25,000 to 50,000 feet of timber per acre; 234 square miles, 10,000 to 25,000 feet; 277 square miles, 5,000 to 10,000 feet.

The principal trees of commercial value are yellow pine, sugar pine and red fir, while the incense cedar, the white fir, the silver fir, white bark pine and numerous other species are also found. The sugar pines reach a great size in this forest, many of them exceeding 200 feet in height and seven feet in diameter, while practically the same dimensions are reached by the yellow pine. The red fir, also, attains good size and is abundant, its range extending to a higher elevation than the kinds mentioned. The incense cedar is a large tree, mingled with the pines and fir. The white and silver firs are symmetrical trees of high value, but of smaller size than the red fir, and their range, according to altitude, extends from about 5,000 to 9,000 feet. The tamarack is a good sized tree at about 7,000 feet elevation, but the trees of commercial value grow best between the altitudes of 4,500 and 6,500 feet. In selected areas in this section of California, the stand will reach as high as 150,000 feet an acre, while the average of the timbered areas, leaving out treeless and brush lands, is estimated at above 30,000 feet to the acre.

All the forest reserves of Washington, Oregon and northern and central California are essentially timber reserves, that is, their prime purpose is to perpetuate a forest growth and timber supply, though all of them have the incidental advantage of the protection of watersheds and, consequently, of promoting irrigation of the semiarid lands depending upon them for water.

The forest reserves of southern California proper, the San Gabriel, San Bernardino, San Jacinto, Santa Barbara, etc., are, however, all designed primarily for the protection of the water supply and they are of little, if any, value for timber.

The San Gabriel Reserve is typical of this class in southern California. It contains 555,520 acres and consists of the crest and a greater portion of the slopes of the western section of the San Gabriel Mountains. The greater portion of the surface of the reserve is semiarid, covered with a growth of brush and chaparral, California juniper or piñon pines. About eighty-one percent of the entire reserve is of this class. The chaparral is composed of forty or more species of shrubs, some of which become trees in favorable situations. Most of them are low, not exceeding five feet in height.

The coniferous species lowest in altitude is the bigcone fir, which constitutes the bulk of the forest between elevations 3,500 and 8,000 feet, and is the most common tree throughout the reserve. Above 4,000 feet two grades of pines are added. At altitudes of 5,500 feet incense cedar and western yellow pine are found, and at altitudes of 6,000 feet white fir is found. On the semiarid tracts below the yellow pine belt the timber growth is open, scattered and of little value, except for fuel. Nearly a hundred thousand acres of the reserve, however, carries trees of commercial value, whose growth is open and park like. The chief species of value are the western yellow pine, the sugar pine and bigcone fir, but altogether it is estimated that the stand of timber on the entire reserve is only about 80,000,000 feet, of which yellow pine constitutes more than half, and the majority of even this quantity is not of a class suitable for sawmill operations.

FOREST RESOURCES OF THE PHILIPPINE ISLANDS.

While entirely apart from the forest reserves of the United States and not to be considered as among the timber resources of this country, the forest area of the Philippine Islands is so large as to be worthy of consideration, more especially as the political status of the islands makes it probable that Philippine timber will come, to a large extent at least, under control of American lumbermen.

It has been extremely difficult accurately to estimate the timbered area of the islands, there being over 1,700 of them in the group, and forestry there being, comparatively speaking, in its infancy. Of course, only the large islands have been considered, and of these the best recognized authorities place the timbered area at between 35,000,000

and 40,000,000 acres, some putting it as high as 50,000,000 acres. The Province of Cagayan, in the extreme northeast of the Island of Luzon, is the most heavily timbered tract in the island. Mindoro contains 2,542,000 acres, almost entirely covered with a tropical forest growth; the great Island of Mindanao, with its 23,191,000 acres, is nearly all forested; while the island of Palawan is credited with 3,000,000 acres of virgin forests. Other heavily timbered areas are found in the Luzon provinces of Isabela, Nueva Vizcaya, Bulacan, Bataan, Tayabas, Principe and Infanta, and the islands of Samar and Leyte.

Philippine timber has had the advantage which comes from receiving forestal protection before the commencement of extensive lumbering operations. May 7, 1904, the Philippine Commission, acting under congressional authority, adopted the "Forest Act," a measure providing for the protection of the timbered areas for the benefit of the people of the islands. Captain George P. Ahearn, of the Ninth Infantry, U. S. A., was placed at the head of the Bureau of Forestry, created by this act, and his investigations have been of material assistance in determining the extent and character of the merchantable timber growth. The chief provisions of the Forest Act, briefly, are as follows:

The public forests shall include all unreserved public lands covered with trees, and these forests shall be held and protected for the public use. The civil Governor, with the approval of the Secretary of the Interior, may set apart from the public lands, as forest reserves, such tracts as may be recommended for that purpose by the Chief of the Bureau of Forestry, and the same shall not be entered, sold or otherwise disposed of. The civil Governor may, however, by proclamation, alter or modify the boundaries of any forest reserve, or revoke any such proclamation, and upon such revocation such forest reserve shall again be considered a part of the public lands.

The Chief of the Bureau of Forestry is given power to make all necessary provisions for the protection, management, reproduction, etc., of public forests, with the object of continuing a supply of timber for future use. He may lease to holders of timber licenses sawmill sites not exceeding four hectares [about ten acres], and may grant free rights of way through public lands where the same are necessary.

In short, the chief of the Bureau of Forestry is given full power for the formulation and pursuance of a policy of forest protection, conservation and reproduction, subject only to the approval of the Secretary of the Interior.

For the purposes of the Forest Act the provinces of the island are divided into classes as follows:

Class A: Abra, Bataan, Batangas, Benguet, Bulacan, Capiz, Cavite, Cebu, Ilocos Norte, Ilocos Sur, Iloilo, Laguna, Nueva Ecija, Pampanga, Pangasinan, Romblon, Rizal, Sorsogan, Tarlac, Union and Zambales.

Class B: Albay, Ambos Camarines, Antique, Bohol, Cagayan, Isabela, Lepanto-Bontoc, Leyte, Masbate, Mindoro, Misamis, Moro, Negros Occidental, Negros Oriental, Nueva Vizcaya, Paragua, Samar, Surigao and Tayabas.

The timber itself is divided into four classes, according to the value of the woods.

On all timber cut on any public land or forest reserve, whether for domestic use or for export there shall be paid into the Insular treasury as follows: On first-class timber, cut from any province in class A, 5 pesos (\$2.50) for each cubic meter (about 47 cubic feet or 565 feet board measure), and when cut in any of the provinces of class B, 2 pesos and fifty centavos (\$1.25). On second-class timber cut in any of the provinces of class A, three pesos (\$1.50); when cut in class B, one peso and fifty centavos (seventy-five cents). On third-class timber the taxes are one peso and fifty centavos (seventy-five cents) and one peso (fifty cents), and on fourth-class timber one peso (fifty cents) and fifty centavos (twenty-five cents), according to whether cut in class A or class B.

Other sections of the act empower the chief of the Bureau of Forestry to grant gratuitous licenses for certain purposes, as for mining, also providing duties and limitations connected therewith.

Under the heading of "Forest Regulations" a number of provisions have been made in conformity with the purposes expressed in the Forest Act. Some of the more important of these are given below:

Holders of timber licenses will be allowed four months within which to begin operations, at the end of which period, in the absence of good reason for delay, the license will be revoked.

Licenses of all classes may be transferred by authority of the forest officer granting the same, or of the chief of the bureau.

Dating from June 30, 1905, every holder of a license is required to perform, personally or through his agents, all operations in the forest under the license which he holds. Failure in this to result in forfeiture of license.

A license agreement will be granted only for territory where extensive cutting, extending over a period of years, can be allowed and where logging operations can be personally superintended by forest officers. Should the amount of timber cut be less than that prescribed in the agreement, the Chief of the Bureau of Forestry may lessen the area covered by the license.

Holders of licenses must exercise particular care in cutting, working up, col-

lecting or transporting timber, firewood, or other forest products to avoid killing or injuring young trees less than forty centimeters [about sixteen inches] in diameter, or seedlings, especially those of the first and second groups. Round timber forty or more centimeters in diameter at the larger end and squared timbers twenty-two centimeters [about nine inches] in width or thickness will be considered of legal size.

Timber cut under license and not removed within the time specified will be charged for at the regular rate.

The timber which has been officially listed by the forestry bureau numbers seventy-one species, best known among which are the calantas, ebony, narra, santol, teak, molave, lauan, apitong, guiyo, yacal, tanguile, sacat and ipil. Lauan is the most extensively used, as it is one of the cheapest of the native woods. It is a soft, reddish white wood, easily worked and corresponds in some respects to American poplar. Narra (both red and white) is known as the mahogany of the Philippines. The ipil, another of the more important woods, ages into a strong resemblance to ebony and is said to be impervious to decay. It is much sought for in Chinese markets. The molave is a white wood, very strong and practically everlasting. It is said to resemble New Zealand teak, and cannot be surpassed for railroad sleepers or for constructive work under water. Yacal is a fine, close-grained wood much in favor with cabinetmakers. The guiyo and tanguile are strong, tough, elastic woods used in shipbuilding and general construction work.

On an average the timber growth of the Philippines is not heavy, judging by standards of United States lumbermen, but in the virgin forests found in the provinces of Cagayan, Isabela, Nueva Vizcaya and all along the coast of Luzon south of Antimonan, the timber is said to run from 5,000 to 10,000 cubic feet to the acre. Indeed, Captain Ahearn's report mentions "20,000 cubic feet of magnificent timber to the acre," but such acres are not numerous enough to consider in estimating the probable yield of large areas.

Since the American occupation of the islands the lumber business and allied industries have improved, but they are still relatively unimportant. Many things combine to make timber manufacture in the Philippine group a much more difficult problem than it is in the United States. There is a great deal of waste in tropical forest growth, and of the larger trees only a portion are suitable for milling, and a certain percentage of these are so burdened with vines and a parasitic growth that the expense of cutting and cleaning them exceeds their market value.

Rafting streams are not common, and some of the native woods are too heavy to float in the water, and, while the character of the timber makes long hauls necessary, keeping roads open is a matter of considerable expense, owing to the heavy and fast-growing undergrowth. Native labor, while cheap, is poor, it being estimated that one white chopper will do the work of eight or nine natives.

In 1902 four wooden packing box plants were running in the islands, employing thirty-one men; thirty-one establishments were engaged in furniture and cabinet making, giving employment to 262 persons, and seventy-eight concerns and individuals were engaged in the manufacture of lumber, representing invested capital amounting to 2,623,037 pesos (\$1,311,518.50). Twenty-six establishments were engaged in ship and boat building, employing 4,200 persons.

Considerable lumbering has been done in the country districts, most of the work being by contract, and the employer generally manages to keep the natives who are working for him in his debt. As a rule, medium-sized logs are selected, being easier to transport than large ones, and the small logs not paying the expense of getting them to market. Labor is paid for by the Spanish cubic foot, the price varying according to the size and hardness of the timber.

From 1900 the islands have been increasing their imports of wood and its manufactures. In that year \$233,504 was received; which amount, in 1901, was increased to \$532,572; in 1902, the total was \$474,238; in 1903, \$539,710, and in 1904, \$623,818. These imports of wood and its products into a country almost half of the area of which is covered with forest growth, is surprising until it is remembered that before the American protectorate was established Spanish timber regulations so tied up the forests that it was impossible for domestic manufacture to thrive.

RECLAMATION OF ARID LANDS BY IRRIGATION.

The two primal objects of the establishment of forest reserves are conservation of timber supply and conservation of moisture. In many cases the denudation of these areas of their forestal covering would result in the land becoming arid, or semiarid, and, consequently, valueless.

During the last three years the Government has done much toward the reclamation of arid lands by irrigation. June 17, 1902, a bill was signed by President Roosevelt which provided (with a few minor exceptions) that all moneys resulting from the sale of public lands in Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Ne-

vada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington and Wyoming, beginning with the fiscal year ended June 30, 1901, should be set aside as a special fund for the examination and survey of lands and the construction and maintenance of irrigation works for the storage, diversion and development of waters in the reclamation of arid and semiarid lands in the states and territories named.

The act gave authority to the Secretary of the Interior to make examinations and surveys for, and to locate and construct, irrigation works and, prior to letting contracts for the construction of them, to withdraw from public entry the lands required for their location and also any public lands proposed to be irrigated. When the land is again open for entry or sale, it shall be divided into tracts not exceeding 160 acres to any one land owner, and not less than forty acres, the size being such as, in the opinion of the secretary, will, under the circumstances, support a family. Before water is turned on, all lands within the area to be irrigated exceeding 160 acres in one ownership shall be reduced to the maximum allowed by the law.

No sales may be made to any land owner unless he be a bona fide resident on such land or an occupant thereof residing in its neighborhood. The land owner shall assume the estimated cost of irrigating his land, payment to be made in not more than ten annual installments, title to remain in the Government until payments are completed.

The water supply for the irrigating works is to be protected by reserves, which will serve not only that purpose but also as forest reserves, assuring timber supplies for the local use of irrigated districts.

From June 30, 1901, to June 30, 1905, there had been set aside for the prosecution of this work \$34,207,000. The subjoined table gives a fair idea of the action taken and in contemplation from the time the reclamation bill went into effect to the date last named above:

PROJECTS UNDER CONSTRUCTION.

PROJECT.	Amount.	Acres.
Salt River, Arizona.....	\$3,600,000	180,000
Yuma, California and Arizona.....	3,000,000	85,000
Uncompahgre, Colorado.....	2,500,000	125,000
Minidoka, Idaho.....	1,300,000	60,000
Huntley, Montana.....	900,000	35,000
Fort Buford, Montana and North Dakota.....	1,800,000	60,000
North Platte, Nebraska and Wyoming.....	3,500,000	100,000
Truckee-Carson, Nevada.....	2,740,000	100,000
Hondo, New Mexico.....	280,000	10,000
Belle Fourche, South Dakota.....	2,100,000	80,000
Shoshone, Wyoming.....	2,250,000	125,000

PROJECTS APPROVED BY THE SECRETARY OF THE INTERIOR.

Klamath Falls, Oregon and California.....	\$1,000,000	236,000
Malheur, Oregon.....	2,250,000	100,000
Milk River, Montana.....	1,000,000	200,000
Bismarck, North Dakota.....	.....	15,000
Buford-Trenton, North Dakota Pumping.....	550,000	18,000
Payette-Boise, Idaho.....	1,300,000	250,000

Estimates of the lands which may be reclaimed vary greatly, and no positive statement is possible, owing to the fact that there are many thousands of acres of arid land which could be reclaimed, but only at an expense which at present would be deemed in excess of its subsequent value. A conservative estimate, made by the engineers who have the work in hand, places the area at from 20,000,000 to 25,000,000 acres, figuring in only such land as is subject to irrigation at a reasonable outlay.

Estimates of the work in hand place the average cost of reclamation at \$17 an acre, while the last census gave \$47 an acre as the average value of irrigated lands in the United States.

CHAPTER XXIX.

UNITED STATES—TARIFF LEGISLATION.

Since the adoption of the Constitution of the United States in 1789 this nation has been almost uninterruptedly committed, in a greater or less degree, to the policy of a protective tariff. Previous to the Revolutionary War the colonies had been administered more with a view to the commercial benefits which might be derived by the mother country than to those that might be enjoyed by the colonies themselves; and this was one of the chief causes of that remarkable contest.

Under English rule there were no import duties on articles of English manufacture. American manufactures were not promoted. American colonists were not simply discouraged in their efforts to manufacture their necessities, but were actually prohibited from doing so and from exporting articles which competed with British products.

Some instances illustrative of this policy may be of interest. In 1699 the British Parliament enacted a law which said that "After the first day of December, 1699, no wool, woolfels, yarn, cloth or woollen manufactures of the English Plantations in America shall be shipped in any of the said English Plantations or otherwise loaden, in order to be transported thence, to any place whatsoever, under the penalty of forfeiting ship and cargo, and £500 for each offence." In 1731 a similar act prohibited the exportation from the American colonies of hats or felts, and limited the number of hatters' apprentices.

In 1749 an act of Parliament was passed "to encourage the importation of pig and bar iron from His Majesty's colonies in America and to prevent the erection of any mills or other engine for slitting or rolling of iron, or any plateing forge to work with a tilt hammer, or any furnace for making steel, in any of the said colonies." In order to protect the English naval trade all the slitting mills in the colonies were ordered to be destroyed, but pig iron could be exported to England free of duty to be manufactured in the mother country and then returned to the colonists.

In 1733 the British government undertook to protect its sugar planters in the British West Indies by compelling all the New England

merchants to buy all of their molasses from them and laid a prohibitory duty upon all sugar and molasses imported into North America from the French islands. The effect of this measure would have been practically to destroy the profitable commerce of the colonial merchants in fish and lumber with the French West Indies, from which they received molasses in return. It was not, however, until 1764 that this measure was enforced, and at the same time the trade between the American colonies and the Spanish American colonies was frowned upon. The next year, 1765, the Stamp Act was passed, bearing with special severity upon the internal life and business of the colonists.

In addition to the acts specifically mentioned above were numerous others in restriction of colonial industry. One prohibited the import of artisans, another the import of woolen machinery, and a later one the import of cotton machinery and artificers in cotton; still another the exportation from England to the colonies of iron and steel machinery and workmen, and another prohibited the import of colliers into America. In fact, British legislation sought to make the colonists producers of agricultural products and exporters of raw material only, and in return to render them absolutely dependent upon the mother country for goods. So successful was this series of legislative acts that in 1781 the imports of the colonies exceeded the exports by \$13,760,000, a sum that appears remarkable when the volume of business in those days is considered. But England was sowing the wind and she reaped the whirlwind.

After the successful issue of the Revolutionary War the united colonies sought to exist under the Articles of Confederation, and did so exist until 1789, though with growing competition between the states and an increasingly vivid demonstration that the National government was too weak to preserve internal peace and promote domestic welfare, and that it did not constitute a government strong enough to take a prominent place in the sisterhood of nations.

Those Articles made a tariff on imports a practical impossibility, because Congress had authority to enact a general tariff only with the consent of every one of the thirteen states. In a country so large as that composed of the old English colonies, small as it was compared with the present area of the United States, such a unanimous consent would be impossible to obtain. The different states, then as now, varied in commercial and industrial interests. The first of the Articles of Confederation, following the declaration of the style of the confed-

eracy to be the "United States of America," declared that "Each state retains its sovereignty, freedom and independence, and every power, jurisdiction and right which is not by this Confederation expressly delegated to the United States in Congress assembled." This emphatic declaration of state rights merely put into definite form the feeling which dominated the states prior to and after its adoption. Article IV declared as follows: "The people of each State shall have free ingress and egress to and from any other State and shall enjoy therein all the privileges of trade and commerce subject to the same duties, impositions, and restrictions as the inhabitants thereof, respectively; provided that such restrictions shall not continue so far as to prevent the removal of property imported into any State to any other State of which the owner is an inhabitant."

In Article IX it was declared that "no treaty of commerce shall be made, whereby the legislative power of the respective States shall be restrained from imposing such imposts and duties on foreigners as their own people are subject to, or from prohibiting the exportation or importation of any species of goods or commodities whatever."

Thus it is seen that, aside from the lack of administrative power in the general Government, the states were so independent as to leave open the way for endless disputes. Some of the northern states were then, as now, largely engaged in manufacturing, and, consequently, favored a tariff by which their industries might be protected and promoted. The South, on the contrary, was then, as afterwards, consistently opposed to a general tariff on manufactured products. There was also at that time a superabundance of sentiment based on a distorted idea of what constituted liberty, while national pride was inchoate. Each of the newly formed states believed itself competent to manage the affairs which particularly pertained to it, and sought to regulate its trade relations with the other states and with foreign countries without regard to the interests of the nation.

In no phase of national legislation could this situation produce greater dissension among the states than in the consideration of the tariff problem, because that which was good for one seemed bad, and often was unquestionably detrimental, to another. There ensued the most remarkable tariff legislation with which the country has ever been afflicted. Pennsylvania provided for a duty of $2\frac{1}{2}$ percent on imports, but New Jersey opened a free port at Burlington, where the Pennsylvania merchants entered their goods and took them surreptitiously

across the river to Pennsylvania, thus escaping the duty imposed by their own State. New Jersey voted to allow Congress to impose a general tariff, but New York, because of its peculiar situation, refused to consent to the measure. New Jersey then withdrew and established a free port at Paulus Hook, in the present Jersey City, where the New York merchants followed the same tactics that had been adopted by the merchants of Philadelphia.

The lumber industry, then hardly more than in its infancy, having to deal with a superabundant natural resource and fearing no competition, was very little affected by either colonial administration or subsequent dissensions among the newly created states. Exports of American lumber and American shipbuilding materials were welcomed into the mother country as well as by the West Indies and other southern countries whose resources were not of a sort adapted to ordinary lumber purposes; nor had the consumption of the forests progressed to such a point that the importation of foreign lumber, aside from certain cabinet woods and manufactures of woods, was even prospective. American lumbermen of that day cared very little about a protective tariff nor asked its assistance in favor of their industry. The lumbermen, in fact, were affected by the tariff conditions of the time only so far as those tariff conditions affected the general commercial situation.

The only industry, dependent upon the forest for its supply, which was seriously concerned was that of shipbuilding. The colonial policy of the British government had been to discourage the building of American ships, for by the Navigation Act Great Britain declared that "No merchandise, either of Asia, Africa or America, except only such as should be imported directly from the place of its growth or manufacture in Europe should be imported into England, Ireland, or any of the plantations, in any but English built ships, belonging either to English or English plantation subjects, navigated by English commanders, and having at least three-fourths of the sailors Englishmen." This first English Navigation Act was passed in 1651, was reenacted after the Restoration, and remained without important changes until the conclusion of the war of American Independence, when the produce of the United States was allowed to be imported into England in ships belonging to citizens of the United States; but it was not until 1845 that the British Parliament adopted the policy of free trade on the high seas.

The condition of the new republic, following a long and costly war, with its component states seriously differing on important subjects and

without a central government strong enough effectually to promote the general commercial and industrial welfare, was almost pitiable. Long afterwards Daniel Webster, in a speech delivered July 8, 1833, in describing the condition of the period subsequent to the successful issue of the War of the Revolution, said: "After the close of the War of the Revolution there came a period of depression and distress on the Atlantic Coast such as the people had hardly felt during the sharpest crises of the war itself. Shipowners, shipbuilders, mechanics, artisans, all were destitute of employment and some of them destitute of bread."

The treaty concluding the Revolutionary War was signed in 1783, and the dissensions which followed under the Articles of Confederation, which have been previously described, led to the adoption in 1789 of the Constitution of the United States.

The first important law passed by the first Congress bore the title: "An act for laying a duty on goods, wares and merchandise imported into the United States." The first section of the act was in these significant words: "Whereas it is necessary for the support of the Government, the discharge of the debts of the United States, and the encouragement and protection of manufactures, that duties be laid on goods, wares and merchandises imported . . ."

The first act of the first Congress prescribed the form of oath to be taken by officials; but the first act affecting the country in general was one imposing a tariff on imports, which was passed by both Houses and signed by President Washington July 4, 1789. In his first presidential message President Washington said: "I cannot forbear indicating to you the expediency of giving effectual encouragement, as well to the introduction of new and useful inventions from abroad, as to the exertions of skill in producing them at home."

Among the first petitions presented to Congress immediately after the organization of Congress under the Constitution, was one from the mechanics, tradesmen and others of Baltimore upon the subject of protecting manufactures. In it were these words: "They confidently hope that the encouragement and protection of American manufactures will claim the earliest attention of the Supreme Legislature of the nation; as it is a universally acknowledged truth that the United States contain within their limits, resources amply sufficient to enable them to become a great manufacturing country, and only want the patriotism and support of a wise, energetic Government." At the same session was

presented a petition from the mechanics and manufacturers of the City of New York, expressing the fear that in its independence the country might have gained only the form of liberty, while lacking the essential elements of prosperity, which said: "Your petitioners have long looked forward with anxiety for the establishment of a Government which would have the power to check the growing evil, and extend a protecting hand to the interests of commerce and the arts." A petition from Boston said: "The citizens of these States conceive the object of their independence but half obtained till those national purposes [American arts and manufactures] are established on a permanent and extensive basis by the legislative acts of the Federal Government."

While, as stated above, the lumbermen in the early years of the republic felt no necessity for the assistance of an import duty upon the products of the forest, it was inevitable that so important a branch of commerce should be recognized in a general tariff act. The only articles of this class enumerated in the act of July 4, 1789, were cabinet wares, canes, walking sticks and whips, which were charged with an import tariff of $7\frac{1}{2}$ percent ad valorem. A general duty of 5 percent was to be collected upon all "goods, wares and merchandises," to use the language of the act, that were not enumerated. Thus, for a few years there was a duty, though small, even upon round timber and the like, which for the most part have been on the free list from 1792 until this time.

By the tariff act of May 2, 1792, "unmanufactured wood" was specifically mentioned and placed on the free list. It is probable that sawed lumber was not included in this classification, as it is today, for when such material was first mentioned (act of July 14, 1832), the language used was as follows: "Boards, planks . . . and all other manufactures of wood." Yet this conclusion is not certain, for by the act of September 11, 1841, it was provided that "boards, planks, staves, scantling, sawed timber and all other descriptions of wood which shall have been wrought into shapes that fit them respectively for any specific and permanent use without further manufacture shall be deemed and taken as manufactured wood." It seems therefore, that rough lumber, at any rate, had been considered unmanufactured wood. In the act of June 7, 1794, is found the expression "cabinet wares, and all manufactures of wood, or of which wood is the material of chief value." Substantially this phraseology thereafter appears in the tariff schedules.

It is probable that the protective policy had little influence in de-

termining the early tariff rates on forest products and their manufactures, but that their rates were for revenue, primarily, with protection to the producers of furniture and other manufactures of wood only incidental, for at that time the wealthier citizens imported most of their household goods, including furniture and cabinet ware, offering an excellent opportunity to secure revenue with incidental protection.

In 1806, the country for the first time found itself confronted with a surplus; but the protective policy was not abandoned. The famous Embargo Act was passed in December, 1807, though ordinarily accredited to 1808. Great Britain and France were at war and each had prohibited all commerce by the world with the other, established blockades and instituted search of neutral vessels. President Jefferson called England "a den of pirates," and France "a den of thieves," and the Embargo Act, at his suggestion, was passed as an act of retaliation. It absolutely prohibited all foreign and coastwise trade—it closed the ports of the country. So impossible were the conditions it created, and so serious were the internal dissensions, dissolution of the Union being threatened, that in March, 1809, it was succeeded by the Non-intercourse Act, which prohibited intercourse with Great Britain and France, but opened the ports to commerce with other countries and to coastwise trade. The embargo was fruitless save of untold damage to the United States, while the countries against whom it was directed actually profited by it in the removal of the commerce of a rival power from the seas and in the expansion of the trade of their own colonies.

The Non-intercourse Act was suspended by proclamation on June 10, 1809, so far as it related to Great Britain. Within a few months \$10,000,000 worth of American property was seized by the French. But difficulties with England continued to increase, arising largely from its claims to right of search, and complicated by an Indian war, which, it was believed, was inspired by England. The final outcome was the declaration of war by the United States against Great Britain on June 18, 1812.

Immediately the necessity for increased revenues was apparent. At the outset of the war custom duties were doubled, causing the 15 per cent ad valorem duty on manufactured woods to be raised to 30 per cent. There were various changes in the tariff following the War of 1812, but none of them affected lumber, the manufactures of wood being charged a duty of 30 per cent ad valorem until the act of 1832 (effective March 3, 1833) was passed, at which time a reduction was made to 25

percent, but cabinet wares were retained at 30 percent. In the meantime there had been some slight additions to the classification of timber and timber products, which did not materially affect the industry, as they consisted chiefly in the itemization of the general divisions of manufactured and unmanufactured. Until 1833 there had been a number of changes in the general tariff policy of the Government, but in that year a compromise measure was adopted, effective from December 31, 1833, by which it was provided that within a period of ten years the excess above 20 percent ad valorem in all schedules should be abolished, the reduction to be made by degrees. This brought about a gradual reduction in the tariff on manufactured lumber to 20 percent in 1842.

The Whigs returned to power in 1842, and Congress passed a high tariff law. This act put rough lumber, sawed timber and some other items, classified as unmanufactured, on the dutiable list, and was characterized by a more minute classification of forest products than had been made up to that time. Some woods which theretofore had been on the free list, were placed on the dutiable list, as, for example, rosewood, mahogany, etc., which were given a duty of 15 percent. The details of this lumber schedule will be given on a following page.

In 1846 the tariff of 1842 was repealed and a tariff law imposing very low duties on imports was substituted, but lumber was left unchanged, except that a 30 percent ad valorem tariff was imposed on unmanufactured woods, which had theretofore been admitted free. No further change was made until 1857, except that during this period the first reciprocity treaty which directly affected forest products was entered into. It provided for free trade in natural products with Canada. The date of the signing of this treaty was June 5, 1854. It took effect on March 16, 1855, and was maintained until March 17, 1866, when it came to an end under a notice authorized by Congress more than a year before. The effect of this treaty has been recounted in a previous chapter (pages 169-171). It changed the balance of trade between the two countries in favor of Canada, and this fact was the ostensible reason for its denouncement.

In 1857 the general tariff was further reduced. The tariff on lumber was reduced to 15 percent and on unmanufactured wood to 24 percent.

In 1861 the adoption of the first Morrill tariff returned the country to the policy of a high protective tariff which it has since followed. The lumber tariff, except as to the Canadian product, was increased to 20 percent, while the tariff on unmanufactured woods was reduced to 20

percent. Since that period there have been many slight changes affecting individual products, but the policy of protection has been pretty well maintained.

It was not until this period that the lumber industry began to be seriously affected by tariff legislation, and American lumbermen began to take an active interest in the tariff question.

The tariff law of 1870 restored logs to the free list, but retained the 20 percent ad valorem tax on lumber. In 1872, for the first time, a specific tariff was placed on lumber, amounting to \$1 a thousand feet board measure on hemlock, whitewood, sycamore and basswood, and \$2 on pine and other varieties of sawed lumber. There had been since April 27, 1816, a steadily enlarging classification of timber and timber products, and this disposition to differentiate the products of the forest in later timber lists was evidenced in the act of 1872 which added a specific tax of 15 cents a thousand on lath, 35 cents a thousand on shingles, \$2 a thousand on pine clapboards and \$1.50 a thousand on spruce clapboards.

The next tariff enactment seriously affecting lumber was the Morrill bill, of March 3, 1883, effective July 1, 1883, which continued in effect until October 1, 1890. It left logs on the free list and retained the tariff of \$1 per thousand feet board measure on hemlock, whitewood, sycamore and basswood lumber, and of \$2 on pine and other varieties of lumber. In this year, however, for the first time a specific tariff was imposed on planed and tongued and grooved lumber; a tariff of 50 cents additional for each side so planed, and of \$1 for lumber planed on one side and tongued and grooved, and of \$1.50 for lumber planed on two sides and tongued and grooved.

THE M'KINLEY BILL OF 1890.

The conflict of interests between the Canadian and American lumbermen became sharply evident during the tariff discussion which preceded the passage of the McKinley bill in 1890. The high lumber tariff imposed by previous bills had led to retaliation on the part of the Canadians, in the shape of an export duty on logs amounting to \$2 a thousand.

The gradual diminution of the native log supply for the American mills on Lake Huron, on Lake Erie and on their connecting waters had reached a point where a number of serious questions had arisen. The prospect was that many of these mills, especially in the Saginaw Valley, would be obliged to shut down or remove unless some new source of

log supply could be secured. These mills represented a heavy investment of capital, and upon them depended, in large degree, the prosperity of a number of communities. There was, therefore, both a financial and a social question involved. Across Lake Huron from Michigan, in the waters tributary to Georgian Bay, were immense pine forests in which American lumbermen had begun to make investments; but while the American duty of \$2 a thousand on sawed pine restricted the importation of the Canadian product, the Canadian export duty on logs largely prevented the importation of that raw material for the saw-mills. In spite of the export duty some logs were brought over, but the profit on the transaction was small. It was, therefore, desirable, from the standpoint of American sawmill owners whose timber was nearly or quite exhausted, that Canada be induced to rescind her restrictions on log export.

The opportunity arose in connection with the revision of the tariff under the leadership of William McKinley. Through the McKinley bill, therefore, which was tinctured throughout with the reciprocity idea, it was sought to solve this problem by reducing the tariff on Canadian

THE MCKINLEY BILL.

(Approved October 1, in effect October 6, 1890.)

SCHEDULE D—WOOD AND MANUFACTURES OF.

216. Timber, hewn and sawed, and timber used for spars and in building wharves, ten per centum ad valorem.

217. Timber, squared or sided, not specially provided for in this act, one-half of one cent per cubic foot.

218. Sawed boards, planks, deals, and other lumber of hemlock, whitewood, sycamore, white pine and basswood, one dollar per thousand feet board measure; sawed lumber, not specially provided for in this act, two dollars per thousand feet board measure; but when lumber of any sort is planed or finished, in addition to the rates herein provided, there shall be levied and paid for each side so planed or finished fifty cents per thousand feet board measure; and if planed on one side and tongued and grooved, one dollar per thousand feet board measure; and if planed on two sides, and tongued and grooved, one dollar and fifty cents per thousand feet board measure; and in estimating board measure under this schedule no deduction shall be made in board measure on account of planing, tonguing and grooving: *Provided*, That in case any foreign country shall impose an export duty upon pine, spruce, elm, or other logs, or upon stave bolts, shingle wood, or heading blocks exported to the United States from such country, then the duty upon the sawed lumber herein provided for, when imported from such country, shall remain the same as fixed by the law in force prior to the passage of this act.

219. Cedar: That on and after March first, eighteen hundred and ninety-one, paving posts, railroad ties, and telephone and telegraph poles of cedar, shall be dutiable at twenty per centum ad valorem.

220. Sawed boards, planks, deals, and all forms of sawed cedar, lignum-vitæ, lancewood, ebony, box, granadilla, mahogany, rosewood, satinwood, and all other cabinet woods not further manufactured than sawed, fifteen per centum ad valorem; veneers of wood, and wood, unmanufactured, not specially provided for in this act, twenty per centum ad valorem.

221. Pine clapboards, one dollar per one thousand.

222. Spruce clapboards, one dollar and fifty cents per one thousand.

223. Hubs for wheels, posts, last-blocks, wagon-blocks, oar-blocks, gun-blocks, heading-

lumber from \$2 a thousand feet to \$1 a thousand feet, provided the Canadian government should remove its export duty of \$2 a thousand feet on logs.

A tacit agreement was entered into between United States and Canadian authorities, or, between parties representing them, to the effect that, if the American duty should be lowered to \$1 a thousand, the export duty on Canadian logs should be abolished. The agreement was carried out on both sides. The remaining \$1 of duty served to restrict Canadian competition in coarse lumber in American lumber markets. Therefore, while that duty was retained there was not much encouragement for American lumbermen to remove their mills to Canada; while the abolition of the Canadian export charge on logs enabled them to be rafted to the American mills to be manufactured, thus maintaining the industry in the districts mentioned.

That tariff act best known as the McKinley bill went into effect October 1, 1890. It very closely followed the lines of the Morrill schedules, the chief exceptions being the reduction of the duty on white pine lumber from \$2 to \$1 a thousand feet, placing it on the same basis as hemlock, whitewood, sycamore and basswood, while all other sawed lumber retained the duty of \$2 a thousand feet. It reduced the duty on white pine shingles to twenty cents a thousand, and on other shingles

blocks, and all like blocks or sticks, rough-hewn or sawed only, twenty per centum ad valorem.

224. Laths, fifteen cents per one thousand pieces.

225. Pickets and palings, ten per centum ad valorem.

226. White pine shingles, twenty cents per one thousand; all other, thirty cents per one thousand.

227. Staves of wood of all kinds, ten per centum ad valorem.

228. Casks and barrels (empty), sugar-box shooks, and packing-boxes and packing-box shooks, of wood, not specially provided for in this act, thirty per centum ad valorem.

229. Chair cane, or reeds wrought or manufactured from rattans or reeds, and whether round, square, or in any other shape, ten per centum ad valorem.

230. House or cabinet furniture, of wood, wholly or partly finished, manufactures of wood, or of which wood is the component material of chief value, not specially provided for in this act, thirty-five per centum ad valorem.

FREE LIST.

754. Wood—Logs, and round unmanufactured timber not specially enumerated or provided for in this act.

755. Fire wood, handle bolts, heading-bolts, stave-bolts, and shingle-bolts, hop-poles, fence-posts, railroad ties, ship timber, and ship-planking, not specially provided for in this act.

756. Woods, namely, cedar, lignum-vitæ, lancewood, ebony, box, granadilla, mahogany, rose-wood, satinwood, and all forms of cabinet-woods, in the log, rough or hewn; bamboo and rattan unmanufactured; briar-root or briar-wood, and similar wood unmanufactured, or not further manufactured than cut into blocks suitable for the articles into which they are intended to be converted, bamboo, reeds, and sticks of partridge, hair-wood, pimento, orange, myrtle, and other woods not otherwise specially provided for in this act; in the rough, or not further manufactured than cut into lengths suitable for sticks for umbrellas, parasols, sunshades, whips, or walking-canes; and India malacca joints, not further manufactured than cut into suitable lengths for the manufactures into which they are intended to be converted.

to thirty cents a thousand, both from thirty-five cents. It also cut the former duty on pine clapboards, of \$2 a thousand, in two. Logs were continued on the free list, and most other items remained unchanged as compared with the previous act.

While the McKinley bill almost exactly followed the wording, arrangement and schedules of the Morrill tariff act, with the exceptions above noted, it introduced for the first time a feature which had so marked an influence on subsequent legislation and on the relations, diplomatic and commercial, between the United States and Canada, that it should be especially mentioned. It was the so-called "retaliatory clause" of Section 218 of the McKinley bill. This section is the one in which is contained the rate of duty on sawed lumber and additional duties on finished lumber. It ended with the clause in question, which read as follows:

Provided, That in case any foreign country shall impose an export duty upon pine, spruce, elm, or other logs, or upon stave bolts, shingle wood, or heading blocks exported to the United States from such country, then the duty upon the sawed lumber herein provided for, when imported from such country, shall remain the same as fixed by the law in force prior to the passage of this act.

This clause was understood to be an expression of the understanding between the two countries as to the action of Canada in regard to the export duty in case the reduction in the American duty on sawed lumber should be accomplished, and was so accepted by the Canadian people. In fact, it came to be popularly regarded by the Canadian lumbermen as in the nature of a contract between the two countries, which could not be violated by either without the consent of the other. So far as the American lumbermen were concerned, it assured them that they would be able to keep their mills sawing on Canadian logs; for they knew it to be of vital importance to many Canadian millmen that they should have a market in the United States for their surplus product. The Canadian mills had three principal markets for their product: First was their own home demand, but so vast were the timber resources of the Dominion and so large its lumber manufacturing capacity, that a large surplus remained which was obliged to find a foreign market. The second of the three markets, therefore, was that furnished by the United Kingdom, but that market was prepared to take only the better grades of lumber, for it had a large and cheap supply of low grade material close at hand on the Baltic. There remained, therefore, for other disposition, largely in the United States, a heavy amount of

lumber, some of it of good grade but chiefly of the lower grades. Shipments to the United States had been, for a number of decades preceding the enactment of the McKinley bill, of great magnitude. This trade varied in quantity but it was always large. In 1871 the imports of sawed lumber from Canada into the United States were 725,746,000 feet board measure; in 1881, 575,210,000 feet, and for the fiscal year ended June 30, 1890, 659,703,000 feet. It was believed—and rightly so, as the event proved—that Canada would be willing to sacrifice somewhat to retain that trade; and it did not, in fact, openly object to what was privately considered the somewhat harsh phraseology of the retaliatory clause.

The immediate result of the removal of the Canadian export duty on logs was a great increase in the shipment of logs from Georgian Bay waters to American mills, with some business of this sort being carried on also on Lake Superior. Previous to this time some Canadian logs had been imported, but not on any large scale. The methods of rafting logs across the waters of the Great Lakes were experimental. Under the new conditions, however, methods of handling logs were perfected, and the business grew to large proportions. It was maintained until 1898 and amounted to more than 330,000,000 feet in some years. The receipts of Canadian logs at Michigan mills, which received most of them, were, for the free period, as follows:

1891.....	80,000,000
1892.....	184,000,000
1893.....	184,500,000
1894.....	301,000,000
1895.....	270,229,743
1896.....	274,388,654
1897.....	252,344,532
1898.....	238,843,024

The new conditions checked the contemplated removal of mills to Canada, and those which had already been established by Americans on Canadian soil were operated at somewhat of a disadvantage, inasmuch as their product had to pay a duty of \$1 a thousand feet, while logs were imported into the United States free of duty, at a cost for rafting which, it was claimed by some, was more than paid for by the sale of offal, which was of no value at all except for local fuel at Georgian Bay mill points.

In the meantime, American millmen had been making very heavy purchases of Ontario stumpage, or, rather, of licenses to cut from Crown lands. The result to the Canadian Crown lands department was a marked increase in the value of timber berths. At the sale of October

18, 1892, 603 square miles of limits were sold at an average price of \$3,657.18 a mile, as against the highest previous price of \$2,859.06. At this sale the highest price for any single square mile was \$17,500, against the previous high price of \$6,300. It will be noted that the heavy investments made during the period of unrestricted exportation of Canadian logs, which lasted until 1898, were the foundation for the establishment of many American manufacturing enterprises in Canada at a later period.

THE WILSON BILL OF 1894.

This was the condition of affairs, so far as the tariff relations of the United States and Canada in the matter of lumber were concerned, when the Wilson bill of 1894 was passed. It went into effect August 28 of that year and marked the greatest change in lumber tariffs that had been seen in twenty years.

The lumber schedule of that bill, which, as a whole, was a grievous disappointment to the free trade school of political economists and was almost as great a disappointment to the administration of President Cleveland, who allowed it to become a law without his signature, was almost the only one which, in its completed form, reflected with approximate accuracy the principles and purpose of the framer of the original bill. It was practically a free trade schedule. It removed the

THE WILSON BILL.

(Adopted August 13, effective August 28, 1894.)

SCHEDULE D—WOOD AND MANUFACTURES OF.

179. Osier or willow, prepared for basket-makers' use, twenty per centum ad valorem; manufactures of osier or willow, twenty-five per centum ad valorem; chair cane, or reeds, wrought or manufactured from rattans or reeds, ten per centum ad valorem.

180. Casks and barrels, empty, sugar-box shooks, and packing boxes and packing-box shooks, of wood, not specially provided for in this Act, twenty per centum ad valorem.

181. Toothpicks of vegetable substance, thirty-five per centum ad valorem.

182. House or cabinet furniture, of wood, wholly or partly finished, manufactures of wood, or of which wood is the component material of chief value, not specially provided for in this Act, twenty-five per centum ad valorem.

FREE LIST.

Ashes, wood and lye of, and beet-root ashes.

Charcoal.

Cork wood or cork bark, unmanufactured.

Wood:

672. Logs, and round unmanufactured timber not specially enumerated or provided for in this Act.

673. Firewood, handle bolts, heading bolts, stave bolts, and shingle bolts, hop poles, fence posts, railroad ties, ship timber, and ship planking, not specially provided for in this Act.

674. Timber, hewn and sawed, and timber used for spars and in building wharves.

675. Timber, squared or sided.

duty from all forms of sawed lumber, rough or dressed, except that made from cabinet woods; from pine and spruce clapboards; from lath, pickets, shingles and staves, and hubs, blocks, logs, bolts, etc. On the dutiable list it placed only casks and barrels, shooks, toothpicks, house or cabinet furniture and manufactures of wood, or of which wood should be the component material of chief value, not otherwise provided for in the act, together with willow, cane and reeds prepared for use.

The full text of the portion of the Wilson bill relating to lumber is given as a footnote herewith. It will be noted that the maintenance of the Canadian concession of free importation of logs was safe-guarded by a provisional or retaliatory clause, similar to that of the McKinley bill, which provided that the duties of the McKinley bill should be imposed on logs, bolts, posts, ties, timber, sawed lumber, lath, shingles, staves, etc., imported from any country which should lay an export duty or impose discriminating stumpage dues on any of them.

The Wilson bill, by removing the \$1 a thousand protection accorded sawed lumber by the tariff act of 1890, which itself had been a concession of \$1 from the preceding act, did not largely affect the volume of importations during its brief existence of a little more than three years. The importations of boards, planks, deals, joists and scantling for the fiscal year ended June 30, 1893, amounted to 742,597,000 feet; the fiscal year of 1894 showed a heavy falling off, the importations of this class of material being only 514,619,000 feet. This was due partly

676. Sawed boards, plank, deals, and other lumber, rough or dressed, except boards, plank, deals and other lumber of cedar, lignum-vitæ, lancewood, ebony, box, granadilla, mahogany, rosewood, satinwood, and all other cabinet woods.

677. Pine clapboards.

678. Spruce clapboards.

679. Hubs for wheels, posts, last blocks, wagon blocks, oar blocks, gun blocks, heading, and all like blocks or sticks, rough hewn or sawed only.

680. Lath.

681. Pickets and palings.

682. Shingles.

683. Staves of wood of all kinds, wood unmanufactured: *Provided*, That all of the articles mentioned in paragraphs six hundred and seventy-two to six hundred and eighty-three, inclusive, when imported from any country which lays an export duty or imposes discriminating stumpage dues on any of them, shall be subject to the duties existing prior to the passage of this Act.

684. Woods, namely, cedar, lignum-vitæ, lancewood, ebony, box, granadilla, mahogany, rosewood, satinwood, and all forms of cabinet woods, in the log, rough or hewn; bamboo and rattan unmanufactured; briar root or briar wood, and similar wood unmanufactured, or not further manufactured than cut into blocks suitable for the articles into which they are intended to be converted; bamboo, reeds, and sticks of partridge, hair wood, pimento, orange, myrtle, and other woods, not otherwise specially provided for in this Act, in the rough, or not further manufactured than cut into lengths suitable for sticks for umbrellas, parasols, sunshades, whips, or walking canes; and India malacca joints, not further manufactured than cut into suitable lengths for the manufactures into which they are intended to be converted.

to the serious business depression of that year, and partly to the prospect, during about eight months of the year, that the duty on lumber would be removed. During the following fiscal year—that of 1895—however, the importations increased to 600,798,000 feet, the following year to 786,209,000 feet, and in 1897 to 883,781,000 feet, which was the highest figure ever reached in sawed lumber, the nearest being 1873, when the record was 818,302,000 feet. More recent years, however, have approached it, 1903, with 720,937,000 feet and 1905, with 710,527,000 feet.

The placing of lumber on the free list removed the last obstacle to the establishment of American lumber manufacturing enterprises in Canada. By that time a number of American milling concerns that were rafting logs from their limits on Georgian Bay, Ontario, waters had decided that, under the circumstances, manufacturing would be more profitable in Ontario than in Michigan. The cost of towing logs, added to the loss of logs by that process, had proved more than to offset any special advantages that might accrue from manufacturing on the American side. The result was the beginning of removal of mills to Canada, a number being erected there, during the life of the Wilson tariff, by American lumbermen.

In this connection there arose a curious thing in relation to American machinery manufacturers; and, so closely associated are the lumbermen and the lumber, shingle and planing mill machinery manufacturers, it should be made a matter of record. When American lumbermen began to move their mills to Canada, they wished to take with them American machinery, but they found that there was a duty of 25 percent on machinery imported into Canada. The consequence was that, while part of the American tariff resulted in locating the lumber mills in Canada, the Canadian tariff prevented the American machinery manufacturers from following the mills to the new field.

The Wilson bill was far from satisfactory to American lumbermen, particularly as conditions, that now have been ameliorated, existed that made open Canadian competition unwelcome. The competition which was liked the least was that of Canadian coarse lumber. In the production of lumber, from timber of an increasing inferiority, American lumbermen were compelled to produce a surplus of coarse stock, a quantity, in fact, which was far in excess of the demand. The cream of the market lay in the East; and the Wilson bill opened this market to Canadian lumber free of duty. This splendid market was near to the

Canadian forests and the western and southern manufacturers of lumber in the United States could not, at a greater distance and with their higher freight rates, hope to compete with the Canadian lumbermen in supplying the East with the coarser grades.

With the triumph of the high tariff idea in the presidential election of 1896, American manufacturers immediately demanded the enactment of a new tariff law, and the lumbermen took organized action to secure a protective tariff for American lumber. The credit for initiative action is to be given to the North Carolina pine country, which spoke through John L. Roper, of Norfolk, Virginia. The cottonwood and yellow pine manufacturers also took action. The Southern Lumber Manufacturers' Association, which represented almost the entire yellow pine industry, placed itself on record as in favor of an import duty on rough lumber, and suggested the calling of a convention, national in its character, to express in definite form the request which the lumber trade of the United States desired to make to Congress.

At the request of a number of lumbermen throughout the country, W. B. Judson, publisher of the *Northwestern Lumberman*, and J. E. Defebaugh, publisher of *The Timberman*, (the two publications which were later consolidated in the *American Lumberman*, of Chicago, Illinois,) called a convention of the lumber industry of the United States, which was held in Cincinnati, Ohio, Tuesday, December 15, 1896. The call is given herewith:

A CALL.

To Lumbermen and Lumber Organizations of the United States:

The lumber trade of this country is apparently of one mind as to the serious injury done to the lumber industry—the greatest manufacturing industry of the country—by the tariff act of 1894, in placing rough lumber upon the free list; while no inconsiderable element of the lumber trade is of the opinion that the tariff act of 1890 was a mistake in that it reduced the tariff on ordinary building lumber imported into the United States from \$2 per one thousand feet to \$1 per one thousand feet board measure.

The injustice done to the lumber industry by the entire abolition of the import duty has been attested by bitter experience, and is emphasized by the fact that it is practically the only American industry of importance that has been entirely deprived of protection.

While the Government has been deprived of much needed revenue, the lumber trade has been subjected to a competition, based on cheap stumpage values, which has been disastrous to investments and profits; and, further, from the fact that it rendered market values uncertain, produced conditions which are prejudicial to lumber dealers as well as lumber manufacturers.

In view of the fact that a revenue measure is now in Congress, and that either that measure or some other must be put into early effect to increase the revenues of the Government, and in order that no hasty or ill-advised action may be taken by our national representatives, it has been urged by many lumbermen's associations and by hundreds of individual lumbermen in all sections of the country that prompt action should be taken by the lumber industry of the United States, looking toward promptly laying before Congress the claims which, with advantage to the Government, with regard for the commercial interests of the United States and in justice to the lumber trade itself, it can make upon it in the way of protection to this industry, of such vital importance to the country at large.

In order that the call for a national convention might come from a source which might be regarded as representing the lumber industry of all sections and in all its branches, the Southern Lumber Manufacturers' Association has, together with numerous individual lumbermen in all sections of the country, requested the undersigned, publishers of journals representing the lumber trade, to call at an early date such a

NATIONAL LUMBER TARIFF CONVENTION.

We, therefore, on behalf of the trade, call a convention of the lumber industry of the United States, to be held at the Grand Hotel, in the city of Cincinnati, Ohio, on Tuesday, the fifteenth day of December, 1896; to which convention every lumbermen's organization of the United States, whether local, state or sectional, or devoted to any particular branch of the lumber industry, is invited and urged to send delegates. Invitation is, furthermore, extended to individual members of the lumber trade to be present and to take part in the deliberations and action of said meeting, under such rules as the convention itself may adopt upon organization.

W. B. JUDSON,

Publisher *Northwestern Lumberman*.

J. E. DEFBAUGH,

Publisher *The Timberman*.

CHICAGO, ILL., December 1, 1896.

Those intending to be present will please promptly notify either of the above at the Grand Hotel, Cincinnati, where they will be Monday morning next.

At this time the Dingley bill was under consideration, and a proposition had been made to place a tariff on lumber equivalent to 60 per cent of the duties named in the act of 1890, which would be \$1.20 a thousand on rough pine lumber. The sentiment rapidly grew among lumbermen that this was entirely inadequate, and the early expressions of individuals and the editorial utterances of the *American Lumberman's* predecessors were in favor of asking restoration of the \$2 tariff. The convention went on record as strongly in favor of such a duty. The following resolutions were adopted:

WHEREAS, The placing of lumber on the free list by the existing tariff law not only promotes ruinous competition on lumber from Canadian mills, but discriminates against lumber as compared with other manufactures; therefore be it

Resolved, That this convention, representing the entire lumber industry of the United States in all lines, respectfully petition Congress to place lumber on the dutiable list; and be it further

Resolved, That each lumber dealer in the United States be urged to furnish to the senators of his state, and to the member of Congress from his district, full information in relation to the needs and condition of the lumber industry, to the end that they can consistently assist in the passage of this measure; finally be it

Resolved, That this convention recognizes the fact that unjust discrimination prevails in some countries in South America and elsewhere, as against American lumber, and that we are entirely opposed to such unjust discrimination, and we invoke the aid of the United States Congress for the purpose of removing the same, either by reciprocity or otherwise.

W. B. MERSHON, Michigan.

A. J. NEIMEYER, Arkansas.

H. C. AKKLEY, Minnesota.

W. T. SMITH, Alabama.

H. CLAY TUNIS, Maryland.

Committee on Resolutions.

The convention in Cincinnati was attended by delegates from thirty-one associations, besides numerous individual operators from all sections of the country. There were lumbermen present from Pennsylvania, Iowa, Montana, Georgia, Alabama, Mississippi, Indiana, Maryland, Wisconsin, Florida, New York, Illinois, Virginia, Louisiana, Minnesota, Arkansas, Oregon, West Virginia, Washington, Missouri, Michigan and Ohio.

J. A. Freeman, of Millville, Arkansas, was chosen temporary chairman and W. B. Judson and J. E. Defebaugh temporary secretaries. C. W. Goodyear, of Buffalo, New York, was made permanent chairman of the convention, and Charles W. Wells, now deceased, of Chicago, permanent secretary.

The convention resulted in the appointment of an aggressive and representative ways and means committee, whose members came from the south Atlantic Coast region, the region of the middle South, the Southwest, the Northwest, the Pacific Coast and the Gulf, and an exhaustive memorial was presented to the Fifty-fifth Congress, asking for the restoration of the \$2 tariff on lumber. It was reënforced by communications from associations and individuals engaged in the lumber trade in various parts of the country.

PASSAGE OF THE DINGLEY BILL.

The tariff of 1897, which was still in effect in 1905, was speedily enacted. Its text is given as a footnote herewith. The Fifty-fifth Con-

gress convened March 15, 1897, in extra session, for the express purpose of enacting a tariff law. Three days later Congressman Dingley, of Maine, chairman of the ways and means committee of the House, reported out the Dingley bill. March 31 the bill passed the House and was sent to the Senate. The Senate referred it to the finance committee, which returned it with amendments on May 4. July 7 the bill passed the Senate and was sent to a conference committee. The bill was finally approved by this committee, was adopted by both houses, and was signed by the President July 24, 1897.

The agitation among American lumbermen which resulted in the Cincinnati convention and which ultimately effected the \$2 tariff on lumber when the Dingley bill was enacted in 1897, was to a considerable extent due to a desire on the part of American lumbermen to

DINGLEY BILL. ACT OF JULY 24, 1897.

SCHEDULE D—WOOD AND MANUFACTURES OF.

194. Timber hewn, sided, or squared (not less than eight inches square), and round timber used for spars or in building wharves, one cent per cubic foot.

195. Sawed boards, planks, deals, and other lumber of whitewood, sycamore, and basswood, one dollar per thousand feet board measure; sawed lumber, not specially provided for in this Act, two dollars per thousand feet board measure; but when lumber of any sort is planed or finished, in addition to the rates herein provided, there shall be levied and paid for each side so planed or finished fifty cents per thousand feet board measure; and if planed on one side and tongued and grooved, one dollar per thousand feet board measure; and if planed on two sides and tongued and grooved, one dollar and fifty cents per thousand feet board measure; and in estimating board measure under this schedule no deduction shall be made on board measure on account of planing, tonguing and grooving: *Provided*, That if any country or dependency shall impose an export duty upon saw logs, round unmanufactured timber, stave bolts, shingle bolts, or heading bolts, exported to the United States, or a discriminating charge upon boom sticks, or chains used by American citizens in towing logs, the amount of such export duty, tax, or other charge, as the case may be, shall be added as an additional duty to the duties imposed upon the articles mentioned in this paragraph when imported from such country or dependency.

196. Paving posts, railroad ties, and telephone, trolley, electric-light and telegraph poles of cedar or other woods, twenty per centum ad valorem.

197. Kindling wood in bundles not exceeding one-quarter of a cubic foot each, three-tenths of one cent per bundle; if in larger bundles, three-tenths of one cent for each additional quarter of a cubic foot or fractional part thereof.

198. Sawed boards, planks, deals, and all forms of sawed cedar, lignum-vitæ, lancewood, ebony, box, granadilla, mahogany, rosewood, satinwood, and all other cabinet woods not further manufactured than sawed, fifteen per centum ad valorem; veneers of wood, and wood, unmanufactured, not specially provided for in this Act, twenty per centum ad valorem.

199. Clapboards, one dollar and fifty cents per thousand.

200. Hubs for wheels, posts, heading bolts, stave bolts, last-blocks, wagon-blocks, oar-blocks, heading-blocks, and all like blocks or sticks, rough-hewn, sawed or bored, twenty per centum ad valorem; fence posts, ten per centum ad valorem.

201. Laths, twenty-five cents per one thousand pieces.

202. Pickets, palings and staves of wood, of all kinds, ten per centum ad valorem.

203. Shingles, thirty cents per thousand.

204. Casks, barrels, and hogsheads (empty), sugar-box shooks, and packing-boxes (empty).

remove from the coarse lumber of American manufacture the competition of Canadian mills. The issue between Canadian lumbermen and American lumbermen, while it somewhat affected, never seriously concerned the upper grades except that as it lessened the demand for low grades it lessened the demand and price of the entire product of the log, particularly on the Atlantic and Pacific coasts; but the manufacture of the upper grades necessitated the production of lower grades in large quantities. So long as the East was open to Canadian lumber without a restrictive tariff, Canada supplied almost the totality of the coarse lumber used in the East.

The Dingley law of 1897, like those of 1894 and 1890, sought to assure the millmen of the United States located along the Great Lakes that Canada would not reimpose its export duty upon logs. But this matter was of special importance at that time because of the danger of retaliation by the Canadian government, not only on account of the replacement of sawed lumber upon the dutiable list, but also because the new tariffs went beyond the duties of the McKinley bill, and were, in fact, those of the old Morrill tariff. The effort was to make this point particularly strong. The clause, as reported to the House by the

and packing-box shooks, of wood, not specially provided for in this Act, thirty per centum ad valorem.

205. Boxes, barrels, or other articles containing oranges, lemons, limes, grape fruit, shad-docks or pomelos, thirty per centum ad valorem: *Provided*, That the thin wood, so called, comprising the sides, tops and bottoms of orange and lemon boxes of the growth and manufacture of the United States, exported as orange and lemon box shooks, may be reimported in completed form, filled with oranges and lemons, by the payment of duty at one-half the rate imposed on similar boxes of entirely foreign growth and manufacture.

206. Chair cane or reeds, wrought or manufactured from rattans or reeds, ten per centum ad valorem; osier or willow prepared for basket makers' use, twenty per centum ad valorem; manufactures of osier or willow, forty per centum ad valorem.

207. Toothpicks of wood or other vegetable substance, two cents per one thousand and fifteen per centum ad valorem; butchers' and packers' skewers of wood, forty cents per thousand.

208. House or cabinet furniture, of wood, wholly or partly finished, and manufactures of wood, or of which wood is the component material of chief value, not specially provided for in this Act, thirty-five per centum ad valorem.

FREE LIST.

699. Logs and round unmanufactured timber, including pulpwoods, firewood, handle-bolts, shingle-bolts, gun-blocks for gun-stocks rough-hewn or sawed or planed on one side, hop-poles, ship-timber and ship-planking; all the foregoing not specially provided for in this Act.

700. Cedar, lignum-vitæ, lancewood, ebony, box, granadilla, mahogany, rosewood, satinwood, and all forms of cabinet woods, in the log, rough, or hewn only; briar root or briar wood and similar wood unmanufactured, or not further advanced than cut into blocks suitable for the articles into which they are intended to be converted; bamboo, rattan, reeds unmanufactured, India malacca joints, and sticks of partridge, hair wood, pimento, orange, myrtle, and other woods not specially provided for in this Act, in the rough, or not further advanced than cut into lengths suitable for sticks for umbrellas, parasols, sunshades, whips, fishing rods, or walking-canes.

Committee on Ways and Means, and as adopted by the House prior to sending it to the Senate, read as follows :

Provided, That in case any foreign country or dependency shall, either directly or indirectly, impose upon pine, spruce, elm, or other saw logs, or round unmanufactured timber, pulp wood, stave bolts, shingle bolts, or heading bolts, an export duty, discriminating Crown dues, ground rents, customs regulations, or other duty or tax, when such articles, or any of them, are exported or intended for export to the United States from such country or dependency, then a duty of twenty-five per centum ad valorem upon the lumber mentioned in this paragraph shall be levied, collected and paid in addition to the duty herein imposed when the same is imported from such country or dependency.

It was believed that the words "customs regulations" in the above would cover any act of the Canadian or Ontario governments calculated to restrict or prevent exportation of logs. But the Senate, in its wisdom, proposed the reenactment of the retaliatory clause as found in the McKinley bill, and carried its point in the conferences between the committees of the two branches of Congress. The clause as it finally became part of the law is given in the full schedule as printed herewith, and provided merely against placing an export duty upon sawlogs and other materials; and provided, instead of an additional charge of 25 percent of the value of the lumber, that merely the amount of such export tax or charge should be added to the duties provided for in the act, which, in regard to lumber, were contained in schedule D. There was left, therefore, an opening of which the Ontario government was prompt to take advantage. It did not impose any export duty upon logs or any of the items mentioned, but simply absolutely forbade any exportation of logs cut from Crown lands after April 1, 1898, which was the date of expiration of the annual licenses to cut from Crown lands. The log importations of 1898 by American mills were still heavy, because the logs had been cut prior to the above date and were rafted across the water boundary during the succeeding season of navigation, but that practically ended the business, the only remaining logs for export being those from the few tracts owned in fee simple and some logs from Indian lands. The Americans who had been harvesting logs in Canada and rafting them to their own side, carried the matter to the Dominion courts and asked relief, but without success. It was claimed by these millmen that they had, at the auction sales of limits, purchased the right to cut, paying large amounts therefor, and that, therefore, law and equity demanded that the Dominion government should maintain the conditions under which they had bought.

It was, in turn, pointed out to the Americans that by the decisions of the Dominion courts they were not owners in fee simple of the lands which they were lumbering, but that the title remained in the Dominion, or the province; they were simply operating under licenses to cut, which, by their terms, were renewable annually under such conditions as the Government might annually determine. The Americans thereupon carried the case to England and by the highest court of the empire were denied relief.

The conditions under which the Canadian logs had been rafted to American mills were thus abolished, with the result of the immediate erection of a number of sawmills by American capital on the shores of Georgian Bay and at Sarnia and Sandwich, Ontario. The licenses, or rather, the privilege of renewing licenses, held by Americans remained in force, but the logs cut thereunder must be manufactured within the Dominion. As time went on other provinces adopted similar measures, though in none other was the prohibition of exports so complete.

JOINT HIGH COMMISSION.

The Dingley bill and the conditions arising out of it, as narrated above, continued until the date of publication of this work; but, in the meantime, there arose, in 1898, a matter which for the time seemed to threaten the duty on lumber as provided for in that act. This was found in the organization and proceedings of the Joint High Commission, so-called.

As the outcome of negotiations opened in Washington in the autumn of 1897, relative to the seal-killing controversy, an agreement between Great Britain, Canada and the United States for the creation of a Joint High Commission was concluded on May 30, 1898. The purpose of this convention was, if possible, to negotiate a treaty by which all existing subjects of controversy between the United States and Canada should be settled definitely and finally. Among the questions to be referred to the commission were the Bering Sea and the sealing difficulties; the establishment of the disputed boundary between Alaska and British Columbia; the northeastern fisheries question, involving the rights of fishing in the North Atlantic, off the Newfoundland and other coasts; the alien labor migration across the Canadian-American border; regulation of the transportation bonding system, and commercial reciprocity between the two countries. It was in connection with the last named clause that lumber manufacturers of the United States felt their interests threatened.

The commission, as it was finally composed, consisted, on behalf of Great Britain, of the Lord High Chancellor, Baron Herschell; on behalf of Canada, of Sir Wilfrid Laurier, premier; Sir Richard Cartwright, minister of trade and commerce, and Sir Louis Henry Davies, minister of marine and fisheries; on behalf of the United States, of Hon. John W. Foster, ex-Secretary of State; United States Senator (in 1905 Vice President) Charles W. Fairbanks, of Indiana; United States Senator Charles J. Faulkner, of West Virginia, and Hon. John A. Kasson, Reciprocity Commissioner. The commission began its sessions in Quebec in the latter part of 1898 and adjourned at Washington in February, 1899, subject to call, which call, owing in part to the settlement, by other means, of some of the most important questions involved, but mainly to the evident impossibility of agreeing on some matters considered vital by one side or the other, was never issued.

Early in the sessions of the Joint High Commission it became apparent that one of the demands of the Canadian representatives on the Commission would be, in connection with the subject of commercial reciprocity, the abolition, or at least a heavy reduction, of the duty on lumber imported into the United States. This aroused American lumber manufacturers. They saw in it a menace to what they considered a protection of vital importance to them, since it was evident that there were few of the American tariff schedules that the Canadian commissioners considered of so large importance to them. The American lumbermen felt that, not only were they in danger of being deprived of needed protection, but of being called upon to carry the bulk of the burden involved in any commercial reciprocity treaty. They felt that if any reduction were to be made in the duty for the benefit of Canadian lumber producers the Canadian government should reciprocate by permitting the free exportation of logs. They manifested a disposition to accept a reduction not to exceed 30 percent of the current tariff, which would have meant \$1.40 a thousand, but contended that the measure of protection under the McKinley bill of \$1 was too low. This was entirely unacceptable to the Canadians.

The result was that the American lumbermen used all their influence, which was great, to oppose any reduction in the lumber duty more than that as suggested above, nor even that unless Canada should recede from its position as to log exports. This was undoubtedly one influence that led to the abandonment of negotiations, though the chief reasons therefor were summed up by the President of the United States in his message to Congress in December, 1899, as follows:

Much progress had been made by the Commission toward the adjustment of many of these questions, when it became apparent that an irreconcilable difference of views was entertained respecting the delimitation of the Alaskan boundary. In the failure of an agreement as to the meaning of articles 3 and 4 of the treaty of 1825 between Russia and Great Britain, which defined the boundary between Alaska and Canada, the American commissioners proposed that the subject of the boundary be laid aside and that the remaining questions of difference be proceeded with, some of which were so far advanced as to assure the probability of a settlement. This being declined by the British commissioners, an adjournment was taken until the boundary should be adjusted by the two governments.

SUMMARY.

The lumber tariffs of the United States, like all other tariffs, have been fixed not only by political and economical considerations and the financial conditions of the Government, but have been influenced by local, sectional or trade considerations. Rough lumber was not mentioned in the early tariff bills enacted by Congress, and it is probable that when, in 1794, a small duty was placed upon manufactured wood it was done as a revenue measure. In fact, the tariffs upon forest products until that of 1842 seem none of them to have been more than incidentally protective in their character.

Indeed, it was not until the opening of the Erie Canal and its feeders, the Welland Canal and the canals connecting the St. Lawrence via the Sorel River and Lake Champlain with the Hudson, that any large importation of Canadian lumber was practicable. With neither railroads nor canals, imports of Canadian products were necessarily confined to shipments across Lake Erie and Lake Ontario, or from the Maritime Provinces to New England and New York ports; but even so, shipments were hardly necessary, and amounted to little, until the immediately available white pine resources of the New England states and New York were exhausted.

The diminution of the supply from that source had, however, reached such a stage during the first third of the Nineteenth Century that imports from Canada were practicable and profitable. They increased so rapidly that it is possible that the protective feature entered into the 20 percent ad valorem duty, which by the act of 1842 was imposed upon rough lumber. Thereafter lumber manufacturers of the United States were claimants for consideration whenever the protective theory dominated the tariff policy of the National government.

The protective features of the various tariffs on lumber and forest products have related almost entirely to imports from Canada, which for many years, because of its proximity to eastern markets and the volume and cheapness of its products, affected seriously the prices of

low grade pine lumber in the northeastern part of the United States and indirectly affected prices everywhere. Of recent years the protection of tariffs has been sought and enjoyed by Pacific Coast manufacturers, to meet the rapid growth of the lumber industry of British Columbia, until at the time of this writing lumber producers in all parts of the United States claim an interest in the tariff policy of the National government.

Since 1897 there has been a decided change in the attitude of Canadians toward this whole subject. Bitterly opposed at first to the reimposition of a duty on lumber imported into the United States after the period of free admission accorded by the Wilson tariff, they now profess satisfaction with the results of that measure. The prohibition of log export, coupled with the United States duty, was seen to be of value as checking a too rapid expansion of the industry in Canada. Thus the Canadian forests have been preserved, a more scientific forest management has resulted, the lumber market has been steadied, and Canada bids fair to remain for generations one of the important timber producing countries of the world; whereas, otherwise, its forest resources were in danger of waste and too rapid decrease.

Since discussion of lumber tariff legislation by the United States necessarily most concerns white pine, a summary of the tariffs on white pine logs and rough lumber since the enactment of the first tariff law in 1789 until now, may be of interest. It is assumed that rough lumber or logs were dutiable when they were not enumerated and when a general duty was attached to all goods, or to unmanufactured woods not specified, though there seems to be some doubt as to the fact. The summary is as follows:

DATE OF ACT.	PINE LOGS.	PINE LUMBER, ROUGH.
July 4, 1789.	5 percent	5 percent
May 2, 1792.	Free	7½ percent
July 14, 1832.	Free	25 percent
September 11, 1841.	Free	Free
August 30, 1842.	Free	20 percent
July 30, 1846.	30 percent	20 percent
August 5, 1854 (Canadian).	Free	Free
March 3, 1857.	24 percent	15 percent
March 2, 1861.	20 percent	20 percent
July 14, 1870.	Free	20 percent
June 6, 1872.	Free	\$2 per M feet
October 1, 1890.	Free	\$1 per M feet
August 13, 1894.	Free	Free
July 24, 1897	Free	\$2 per M feet

SUMMARIES OF LUMBER TARIFFS.

From the tariff laws of the United States, since the establishment of the Government under the Constitution, have been selected those portions which relate to such forest products as form part of the lumber industry. These portions are given in the following summaries, some of them verbatim, some of them paraphrased, and some of them in tabular form. Especially significant portions are quoted. Laws which made no changes in duties on such goods are not mentioned. In all cases the respective rates are, for convenience, set apart from the text. Where rates per centum are given, the duties are ad valorem; in all other cases they are specific:

Act of July 4, 1789.

All cabinet wares.....	7½ percent.
Canes, walking sticks and whips.....	7½ percent.
All other goods, wares, and merchandise.....	5 percent.

Act of August 10, 1790. New act. Repeals previous duties.

Cabinet wares.....	7½ percent.
All other goods, wares and merchandise (not specially excepted)	5 percent.

Act of May 2, 1792. Duties changed on items specifically mentioned only.

Cabinet wares.....	10 percent.
Unmanufactured wood.....	Free.
All goods, wares and merchandise, not specially excepted.....	7½ percent.

Act of June 7, 1794. Effective July 1, 1794. "Sec. 1. . . . There shall be levied, collected and paid upon the following articles imported into the United States, in ships or vessels of the United States, the several duties hereinafter mentioned, over and above the duties now payable by law;—viz: . . .

"Five per cent. ad valorem.

". . . On cabinet wares, and all manufactures of wood, or of which wood is the material of chief value. . . .

"Sec. 2. . . . There shall be laid, levied, and collected, in addition to the present duty thereupon, a duty of 2½ per cent. ad valorem, upon all goods, wares and merchandise, which, if imported in ships or vessels of the United States, are now chargeable, by law, with a duty of 7½ per cent. ad valorem."

Cabinet wares and all manufactures of wood or of which wood is the material of chief value.....	15 percent.
Unmanufactured wood.....	Free.

Act of July 1, 1812. "An additional duty of 100 per centum upon the permanent duties now imposed by law upon goods, wares and merchandise imported into the United States shall be levied and collected. . . . To continue in force until one year after conclusion of peace with Great Britain."

Cabinet wares and all manufactures of wood or of which wood is the material of chief value.....	30	percent.
Unmanufactured woods.....		Free.
<i>Act of April 27, 1816.</i> Effective July 1, 1816.		
Cabinet wares and all manufactures of wood.....	30	percent.
Wood, unmanufactured, of any kind.....		Free.
<i>Act of July 14, 1832.</i> Effective March 3, 1833. "Boards, planks, . . . and all manufactures of wood, not otherwise specified, 25 per centum ad valorem; cabinet wares, 30 per centum." [This seems to be the only act in which boards and planks are considered manufactured wood.]		
Boards and planks	25	percent.
All manufactures of wood, not otherwise specified.....	25	percent.
Cabinet wares.....	30	percent.
Wood, unmanufactured, of any kind.....		Free.
<i>Act of March 2, 1833.</i> "Be it enacted," etc., "That, from and after December 31, 1833, in all cases where duties are imposed on foreign imports, by the act of July 14, 1832, . . . or by any other act, shall exceed 20 per centum on the value thereof, one-tenth part of such excess shall be deducted; from and after December 31, 1835, another tenth part thereof shall be deducted; from and after December 31, 1837, another tenth part thereof shall be deducted; from and after December 31, 1839, another tenth part thereof shall be deducted; and from and after December 31, 1841, one-half of the residue of such excess shall be deducted; and from and after June 30, 1842, the other half thereof shall be deducted."		
<i>Act of September 11, 1841.</i> Effective September 30, 1841. . . . "There shall be laid, collected and paid on all articles which are now admitted free of duty or which are chargeable with a duty of less than 20 per centum ad valorem, a duty of 20 per centum ad valorem except on the following enumerated articles, that is to say: . . . dye woods of all kinds, unmanufactured woods of any kind, except rosewood, satinwood and mahogany. . . . <i>Provided,</i> That boards, planks, staves, scantling, sawed timber and all other descriptions of wood which shall have been wrought into shapes that fit them respectively for any specific and permanent use without further manufacture shall be deemed and taken as manufactured wood."		
Boards, planks, staves and scantling, wrought, as per act of March 2, 1833.....		Dutiable.
Sawed timber, wrought, as per act of March 2, 1833.....		Dutiable.
Cabinet wares, as per act of March 2, 1833.....		Dutiable.
All other manufactured wood, as per act of March 2, 1833.....		Dutiable.
Dye woods of all kinds.....		Free.
Unmanufactured wood, n. o. s. ¹		Free.

¹ Not otherwise specified.

Rough boards, planks, staves, scantling and sawed timber.....	Free.
Rosewood, satinwood and mahogany, unmanufactured.....	20 percent.
<i>Act of August 30, 1842.</i> Section 5, paragraph 11. ". . . Boards, planks, staves, scantlings, hewn or sawed timber, unwrought spars, and all other descriptions of wood which shall have been wrought into shapes that fit them, respectively, for any specific and permanent use without further manufacture, shall be deemed and taken as manufactured wood, and pay duty accordingly. . . . Rough boards, planks, staves, scantling, and sawed timber, not planed or wrought into any shapes for use, shall pay a duty of 20 per centum ad valorem."	
Boards, planks, staves and scantling, wrought.....	30 percent.
Hewn or sawed timber, wrought.....	30 percent.
Unwrought spars.....	30 percent.
Cabinet wares or household furniture, n. o. s.....	30 percent.
All manufactures of wood, n. o. s.....	30 percent.
Timber used in building wharves.....	20 percent.
Firewood.....	20 percent.
Rough boards, planks, staves and scantling.....	20 percent.
Sawed timber, rough.....	20 percent.
Rosewood, satinwood, mahogany and cedar wood.....	15 percent.
Dye woods in stick.....	Free.
Unmanufactured woods, n. o. s.....	Free.
<i>Act of July 30, 1846.</i> Effective December 1, 1846. New act. Repeals all previous duties.	
Manufactures of cedar wood, granadilla, ebony, mahogany, rosewood and satinwood.....	40 percent.
Furniture, cabinet and household.....	30 percent.
Manufactures of wood, or of which wood is the component part, n. o. s.....	30 percent.
Wood, unmanufactured, n. o. s.....	30 percent.
Firewood.....	30 percent.
Boards, planks, staves, lath, scantling, spars.....	20 percent.
Timber, hewn and sawed.....	20 percent.
Timber used in building wharves.....	20 percent.
Cedar wood, ebony, granadilla, mahogany, rosewood and satinwood, unmanufactured.....	20 percent.
<i>Act of August 5, 1854.</i> "Be it enacted," etc., "That, whenever the President of the United States shall receive satisfactory evidence that the Imperial Parliament of Great Britain and the Provincial Parliaments of Canada, New Brunswick, Nova Scotia and Prince Edward's Island, have passed laws on their part to give full effect to the provisions of the treaty between the United States and Great Britain, signed on the fifth of June last, he is hereby authorized to issue his proclamation, declaring that he has such evidence, and thereupon, from the date of such procla-	

mation, the following articles, being the growth and produce of said provinces of Canada, New Brunswick, Nova Scotia, and Prince Edward's Island; to-wit:

" . . . Timber and lumber of all kinds, round, hewed and sawed, unmanufactured in whole or in part; fire-wood; . . . —shall be introduced into the United States" Free.

The treaty above referred to, affecting Canadian agricultural, forest, mines, and fishery products, took effect March 16, 1855, and terminated March 17, 1866.

Act of March 3, 1857.

Furniture, cabinet and household	24	percent.
Manufactures of wood, or of which wood is the component part, n. o. s.	24	percent.
Wood, unmanufactured, n. o. s.	24	percent.
Firewood	24	percent.
Boards, planks, staves, lath, scantling and spars	15	percent.
Timber, hewn and sawed	15	percent.
Timber used in building wharves	15	percent.
Cedar, lignum-vitæ, ebony, box, granadilla, mahogany, rose-wood, satinwood and all cabinet woods	8	percent.
Shingle bolts and stave bolts		Free.

Act of March 2, 1861.

Boards, planks, staves, lath, scantling and spars	20	percent.
Timber, hewn and sawed	20	percent.
Timber used in building wharves	20	percent.
Firewood	20	percent.
Wood, unmanufactured, n. o. s.	20	percent.
Furniture, cabinet and household	30	percent.
Manufactures of cedar wood, granadilla, ebony, mahogany, rose-wood and satinwood	30	percent.
Manufactures of wood, or of which wood is the chief component part, n. o. s.	30	percent.
Sandalwood		Free.
Shingle bolts and stave bolts		Free.
Staves for pipes, hogsheads, or other casks		Free.
Cedar, lignum-vitæ, lancewood, ebony, box, granadilla, mahogany, rosewood, satinwood and all cabinet woods, unmanufactured		Free.

Act of July 14, 1862.

Boards, planks, staves, lath, scantling and spars	20	percent.
Timber, hewn and sawed	20	percent.
Timber used in building wharves	20	percent.
Firewood	20	percent.
Wood, unmanufactured, n. o. s.	20	percent.
Furniture, cabinet and household	35	percent.

Manufactures of cedar wood, granadilla, ebony, mahogany, rosewood and satinwood.....	35	percent.
Manufactures of wood, or of which wood is the chief component part, n. o. s.....	35	percent.
Cork wood, unmanufactured.....	30	percent.
Staves for pipes, hogsheads, or other casks.....	20	percent.
Sandalwood.....		Free.
Shingle bolts and stave bolts.....		Free.
Cedar, lignum-vitæ, lancewood, ebony, box, granadilla, mahogany, rosewood, satinwood and all cabinet woods, unmanufactured.....		Free.
<i>Act of April 29, 1864.</i> "Resolved," etc., "That until the end of sixty days from the passage of this resolution, 50 percent of the rates of duties and imposts now imposed by law on all goods, wares, merchandise, and articles imported, shall be added to the present duties and imposts now charged on the importation of such articles. . . ."		
<i>Act of March 16, 1866.</i> "Be it enacted," etc., "That the produce of the forests of the State of Maine upon the Saint John river and its tributaries, owned by American citizens, and sawed or hewed in the Province of New Brunswick by American citizens, (the same being unmanufactured in whole or in part,) which is now admitted into the ports of the United States free of duty, shall continue to be so admitted under such regulations as the Secretary of the Treasury shall from time to time prescribe."		
<i>Act of June 1, 1866.</i> "Be it enacted," etc., "That the produce of the forests of the State of Maine upon the Saint Croix river and its tributaries, owned by American citizens, and sawed in the Province of New Brunswick by American citizens, (the same being unmanufactured in whole, or in part,) and having paid the same taxes as other American lumber on that river, shall be admitted into the ports of the United States free of duty, under such regulations as the Secretary of the Treasury shall from time to time prescribe."		
<i>Act of July 14, 1870.</i> The only change, affecting the lumber business, made in the tariff by this act was the addition to the free list of the following articles:		
Cork wood, unmanufactured.....		Free.
Hemlock bark.....		Free.
Logs and round unmanufactured timber not otherwise provided for, and ship timber.....		Free.
Oak bark.....		Free.
Sandalwood.....		Free.
Woods, viz.: Poplar, or other woods for the manufacture of paper		Free.
<i>Act of June 6, 1872.</i> Effective August 1, 1872. Repeals former tariffs and imposes new duties. "When lumber of any sort is		

planed or finished, in addition to the rates herein provided, there shall be levied and paid, for each side so planed or finished, fifty cents per thousand feet; and if planed on one side and tongued and grooved, \$1 per thousand feet; and if planed on two sides and tongued and grooved, \$1.50 per thousand feet."

Timber, squared or sided, n. o. s., per cubic foot.....	1 cent.
Sawed boards, plank, deals and other lumber of hemlock, white-wood, sycamore and basswood, per thousand feet b. m.....	\$1.00
All other varieties of sawed lumber, per thousand feet b. m....	\$2.00
Hemlock, whitewood, sycamore and basswood lumber planed or finished on one side, per thousand feet.....	\$1.50
All other varieties of sawed lumber planed or finished on one side, per thousand feet.....	\$2.50
Hemlock, whitewood, sycamore and basswood lumber planed on one side and tongued and grooved, per thousand feet.....	\$2.00
All other varieties of sawed lumber planed on one side and tongued and grooved, per thousand feet.....	\$3.00
Lath, per thousand pieces.....	15 cents.
All shingles, per thousand.....	35 cents.
Pine clapboards, per thousand.....	\$2.00
Spruce clapboards, per thousand.....	\$1.50
Hubs for wheels, posts, last blocks, wagon blocks, oar blocks, gun blocks, heading blocks, etc., rough-hewn or sawed only.	20 percent.
Pickets and palings.....	20 percent.
House or cabinet furniture, in pieces or rough, and not finished.	30 percent.
Cabinet wares and house furniture, finished.....	35 percent.
Casks and barrels, empty, sugar-box shooks, and packing boxes of wood, n. o. s.....	30 percent.
Firewood.....	Free.
Logs, and round unmanufactured timber n. o. s. and ship timber	Free.
Railroad ties, of wood.....	Free.

Act of March 3, 1873. "Be it enacted," etc., "That on and after the date of the passage of this act, for all purpose relating to custom duties and importation 'heading bolts' shall be held and construed to be included under the term 'stave bolts.' "

Act of February 8, 1875. The only change, affecting the lumber industry, made by this act was :

Ship planking and handle bolts.....	Free.
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Act of March 3, 1883. The Morrill tariff.

Schedule D.

Timber, squared or sided, n. o. s., per cubic foot.....	1 cent.
Sawed boards, plank, deals and other lumber of hemlock, white-wood, sycamore and basswood, per thousand feet b. m.....	\$1.00
All other sawed lumber, per thousand feet b. m.....	\$2.00
When lumber of any sort is planed or finished, for each side so planed or finished, per thousand feet b. m., an additional..	50 cents.

When lumber is planed on one side and tongued and grooved, per thousand feet b. m., an additional.....	\$1.00	
When lumber is planed on two sides and tongued and grooved, per thousand feet b. m., an additional.....	\$1.50	
Lath, per thousand pieces.....	15 cents.	
Shingles, per thousand.....	35 cents.	
Pine clapboards, per thousand.....	\$2.00	
Spruce clapboards, per thousand.....	\$1.50	
Timber, hewn and sawed, and timber used for spars and in building wharves.....	20	percent.
Hubs for wheels, posts, last blocks, wagon blocks, oar blocks, gun blocks, heading blocks, etc., rough-hewn or sawed only.	20	percent.
Staves of wood of all kinds.....	10	percent.
Pickets and palings.....	20	percent.
House or cabinet furniture, in pieces or rough, and not finished.	30	percent.
Cabinet wares and house furniture, finished.....	35	percent.
Casks and barrels, empty, sugar-box shoofs, and packing boxes, and packing-box shoofs, of wood, n. o. s.....	30	percent.
Manufactures of cedar wood, granadilla, ebony, mahogany, rose- wood and satinwood.....	35	percent.
Manufactures of wood, or of which wood is the chief component part, n. o. s.....	35	percent.
Wood, unmanufactured, n. o. s.....	20	percent.
Cork wood, unmanufactured.....		Free.
Firewood.....		Free.
Hop poles.....		Free.
Logs, and round, unmanufactured timber, n. o. s., and ship timber and ship planking.....		Free.
Railroad ties, of wood.....		Free.
Shingle bolts and stave bolts (including heading bolts).....		Free.
Handle bolts.....		Free.
Woods, poplar, or other woods, for the manufacture of paper..		Free.
Woods, namely, cedar, lignum-vitæ, lancewood, ebony, box, granadilla, mahogany, rosewood, satinwood, and all cabinet woods, unmanufactured.....		Free.

Act of October 1, 1890. Effective October 6, 1890. The McKinley tariff.

Schedule D.

Timber, squared or sided, n. o. s., per cubic foot.....	½ cent.
Sawed boards, planks, deals and other lumber of hemlock, white- wood, sycamore, white pine and basswood, per thousand feet b. m.....	\$1.00
Sawed lumber, n. o. s., per thousand feet b. m.....	\$2.00
When lumber of any sort is planed or finished, for each side so planed or finished, per thousand feet b. m., an additional..	50 cents.
When lumber of any sort is planed on one side and tongued and grooved, per thousand feet b. m., an additional.....	\$1.00

When lumber of any sort is planed on two sides, and tongued and grooved, per thousand feet b. m., an additional.....	\$1.50	
Pine clapboards, per thousand.....	\$1.00	
Spruce clapboards, per thousand.....	\$1.50	
Lath, per thousand pieces.....	15 cents.	
White pine shingles, per thousand.....	20 cents.	
All other shingles, per thousand.....	30 cents.	
Timber, hewn and sawed, and timber used for spars and in building wharves.....	10	percent.
Paving posts, railroad ties, and telephone and telegraph poles of cedar, on and after March 1, 1891.....	20	percent.
Sawed boards, planks, deals and all forms of sawed cedar, lignum-vitæ, lancewood, ebony, box, granadilla, mahogany, rosewood, satinwood and all other cabinet woods, sawed...	15	percent.
Veneers of wood, and wood, unmanufactured, n. o. s.....	20	percent.
Hubs for wheels, posts, last blocks, wagon blocks, oar blocks, gun blocks, heading blocks, etc., rough-hewn or sawed only.	20	percent.
Pickets and palings.....	10	percent.
Staves of wood of all kinds.....	10	percent.
Casks and barrels (empty), sugar-box shoeks, and packing boxes and packing-box shoeks, of wood, n. o. s.....	30	percent.
House or cabinet furniture, of wood, wholly or partly finished..	35	percent.
Manufactures of wood, or of which wood is the component material of chief value, n. o. s.....	35	percent.
Logs, and round unmanufactured timber, n. o. s.....		Free.
Firewood, handle bolts, heading bolts, stave bolts and shingle bolts, hop poles, fence posts, railroad ties, ship timber and ship planking, n. o. s.....		Free.
Woods, namely, cedar, lignum-vitæ, lancewood, ebony, box, granadilla, mahogany, rosewood, satinwood and all forms of cabinet woods, in the log, rough or hewn..		Free.
Briar-root or briar-wood, and similar wood unmanufactured....		Free.

Act of August 13, 1894. Effective August 28, 1894. The Wilson tariff.

Schedule D.

Casks and barrels, empty, sugar-box shoeks, and packing boxes and packing-box shoeks, of wood, n. o. s.....	20	percent.
Toothpicks of vegetable substance.....	35	percent.
House or cabinet furniture, of wood, wholly or partly finished..	25	percent.
Manufactures of wood, or of which wood is the component material of chief value, n. o. s.....	25	percent.
Logs, and round unmanufactured timber, n. o. s.....		Free.
Firewood, handle bolts, heading bolts, stave bolts, and shingle bolts, hop poles, fence posts, railroad ties, ship timber and ship planking, n. o. s.....		Free.
Timber, hewn and sawed, and timber used for spars and in building wharves.....		Free.

Timber, squared or sided.....	Free.
Sawed boards, plank, deals and other lumber, rough or dressed, except boards, plank, deals and other lumber of cedar, lig- num-vitæ, etc., and all other cabinet woods	Free.
Pine clapboards.....	Free.
Spruce clapboards.....	Free.
Hubs for wheels, posts, last blocks, wagon blocks, oar blocks, gun blocks, heading, etc., rough-hewn or sawed only	Free.
Lath	Free.
Pickets and palings.....	Free.
Shingles	Free.
Staves of wood of all kinds.....	Free.
Wood unmanufactured.....	Free.
Woods, namely, cedar, lignum-vitæ, lancewood, ebony, box, granadilla, mahogany, rosewood, satinwood and all forms of cabinet woods, in the log, rough or hewn.....	Free.
Briar-root or briar-wood, and similar wood unmanufactured....	Free.

Act of July 24, 1897. The Dingley tariff.

Schedule D.

Timber hewn, sided, or squared (not less than eight inches square), and round timber used for spars or in building wharves, per cubic foot.....	1 cent.
Sawed boards, planks, deals and other lumber of whitewood, sycamore and basswood, per thousand feet b. m.....	\$1.00
Sawed lumber, n. o. s., per thousand feet b. m.....	\$2.00
When lumber of any sort is planed or finished, for each side so planed or finished, per thousand feet b. m., an additional..	50 cents.
When lumber of any sort is planed on one side and tongued and grooved, per thousand feet b. m., an additional.....	\$1.00
When lumber of any sort is planed on two sides and tongued and grooved, per thousand feet b. m., an additional.....	\$1.50
Kindling wood in bundles not exceeding one-quarter of a cubic foot each, per bundle.....	3-10 cent.
Kindling wood in larger bundles, for each additional quarter of a cubic foot or fractional part thereof.....	3-10 cent.
Clapboards, per thousand.....	\$1.50
Lath, per thousand pieces.....	25 cents.
Shingles, per thousand.....	30 cents.
Toothpicks of wood or other vegetable substance, per M..... {	2 cents and 15 percent.
Butchers' and packers' skewers of wood, per thousand.....	40 cents.
Paving posts, railroad ties, and telephone, trolley, electric-light and telegraph poles of cedar or other woods.....	20 percent.
Sawed boards, planks, deals and all forms of sawed cedar, lig- num-vitæ, lancewood, ebony, box, granadilla, mahogany, rosewood, satinwood and all other cabinet woods, sawed... 15	percent.
Veneers of wood, and wood, unmanufactured, n. o. s..... 20	percent.

LUMBER INDUSTRY OF AMERICA.

Hubs for wheels, posts, heading bolts, stave bolts, last blocks, wagon blocks, oar blocks, heading blocks, etc., rough-hewn, sawed, or bored.....	20	percent.
Fence posts.....	10	percent.
Pickets, palings and staves of wood, of all kinds.....	10	percent.
Casks, barrels and hogsheads (empty), sugar-box shoeks, and packing boxes (empty), and packing-box shoeks, of wood, n. o. s.....	30	percent.
Boxes, barrels, or other articles containing oranges, lemons, etc. (see text of act for proviso).....	30	percent.
House or cabinet furniture, of wood, wholly or partly finished..	35	percent.
Manufactures of wood, or of which wood is the component material of chief value, n. o. s.....	35	percent.
Logs and round unmanufactured timber, including pulpwoods, firewood, handle bolts, shingle bolts, gun blocks for gunstocks rough-hewn or sawed or planed on one side, hop poles, ship timber and ship planking; all n. o. s.....		Free.
Cedar, lignum-vitæ, lancewood, ebony, box, granadilla, mahogany, rosewood, satinwood and all forms of cabinet woods, in the log, rough, or hewn only.....		Free.
Briar-root or briar-wood and similar wood unmanufactured....		Free.

CHAPTER XXX.

UNITED STATES—LUMBER PRODUCTION.

A comprehensive history of the lumber industry would be incomplete without comparative statistics regarding the value of forest products; but, unfortunately, such are not obtainable in complete form, and it is only since 1850 that the decennial censuses of the United States have been of much value in this respect. Prior to that time records were incomplete, or lacking altogether, and what there are may more properly be treated under the caption of the respective states or sections, this chapter having to do with the country as a whole.

Lumber production began with the first settlement, and it was established as an industry as labor became diversified and villages, towns and cities arose whose needs could not be supplied from the timber within their boundaries or immediately adjacent. The sawmill industry was, therefore, recognized at an early date in the history of white settlement within the present United States.

As a local industry, the sawmill could be, and was, located at any point convenient to the demand which it supplied, provided always that there was a stream furnishing power, for the sawmill of the old type antedated the practical use of steam. As the mills began to be called upon to supply a more remote demand, they were more definitely located with respect to water transportation routes, for lumber is a bulky commodity that is with difficulty and high expense moved by road vehicles; therefore, the first sawmills, aside from those cutting for purely local use, were established on the coast at the mouths of streams down which the logs could be floated, or on streams down which their product could be rafted to market, or on streams of such size and character that they could be reached by vessel.

Thus, at an early date there were mills as far inland as the site of Augusta, on the Kennebec River, in Maine, and as early as 1682 there were six sawmills in Kittery, at the mouth of the Piscataqua River, and twenty-four in the territory now known as Maine. The first sawmill in Massachusetts was erected about 1633; the first in New Hampshire, near Portsmouth, before 1635, and the French settlers had sawmills at Ticonderoga at a very early date. The Dutch settlers had mills on the Delaware even before the arrival of William Penn, and the industry de-

veloped rapidly in the section later known as Pennsylvania. In 1786 there were sixteen sawmills within thirty-nine miles of Lancaster, Pennsylvania. The first mill in McKean County, Pennsylvania, was built at Ceres in 1798, and was a step in the westward movement of the industry toward the region of the Great Lakes and the upper Ohio. The State of New York numbered as many as thirteen mills in the Seventeenth Century, and at the outbreak of the Revolution fifty-two were recorded as established, the shores of the Hudson furnishing sites for most of them. The rivers farther to the south, such as the Potomac, the James and others, had sawmills on their banks at an early date.

As the country developed, the lumber industry extended always along the lines of water transportation, in its westward march following two chief courses: One along the Great Lakes, and the other, at first the more important, across New York and Pennsylvania by the rivers. Until about 1880, this dependence of the lumber industry upon water transportation remained almost unbroken. It was not until settlement in the valley of the Ohio River advanced so that its villages began to grow into cities that the lumber trade of that region assumed real importance. From the Allegheny and Monongahela rivers lumber development progressed down the Ohio until lumber manufacture became one of the chief industries of Ohio, Indiana, Kentucky and Tennessee. In the meantime, following the line of the Great Lakes, Michigan was being developed. Closely following that State came Wisconsin and Minnesota and the establishment of mills in the Mississippi Valley.

The lumber industry of the South was early developed, and for many years led the other sections of the country in the proportion of the product that was exported. Nevertheless, the interior was most rapidly developed in the north, along the lines above mentioned. With the railroad era of transportation the pine forests of Michigan, Wisconsin and Minnesota attracted the most attention, then came the opening of the interior pine regions of the South, and, finally, as eastern supplies began to show exhaustion, or as opportunities for timber investments at low prices became less numerous, the Pacific Coast became the scene of the most active exploitation.

Of all these vast movements the United States census furnishes the only complete record, other efforts have been made to secure and preserve the facts as to particular sections or as to special departments of the industry. The State of New York, for example, requires an account of the lumber cut in the Adirondacks, the Forest, Fish and Game Commission of the State submitting a report to the State

annually. The *American Lumberman* for more than thirty years has compiled statistics yearly of the lumber production of Wisconsin, Michigan and Minnesota, and, of late years, different lumber associations have collected reports from their members. But there are no statistics referring to the lumber industry of the country as a whole except the census figures, and of them only those of the last fifty years are of much value, owing to the incompleteness or entire lack of the earlier ones. For this reason allowances must be made in comparing reports of the earlier censuses with those of later years.

The census rests upon a provision of the Constitution for the apportionment of representatives and of direct taxes among the states according to population, and the first census report authorized by the first Congress was an enumeration of population only. In 1800 memorials were presented to the Senate asking that the census be expanded to include other useful information. The census of 1800 contained a few new features not of much importance, and that of 1810 was enlarged still more, embracing an account of manufactures, with results of little value. The experiment was repeated at the following census and wholly abandoned in 1830. In 1840 manufactures were again included, and fragmentary reports were secured, but it was not until 1850 that results of substantial value were obtained. At that time the scope of the census was greatly enlarged, and now not only is the number of people taken into account, and age, race and marital relations given, but also the occupations of the people and the facts regarding the industries in which they are engaged.

Some of the earlier census reports, while not affording information of much value to the lumber industry, are interesting, nevertheless, and throw side lights upon some features of the business that belong now entirely to the past. They are also interesting as showing the crude methods of the Government of the young republic.

The census of 1810, which was the first to include, to any extent worthy of mention, anything besides the enumeration of the population, may be styled an industrial census. The part devoted to industries was headed as follows: "A Series of Tables of the Several Branches of American Manufactures, exhibiting them in Every County of the Union so far as They are returned in the reports of the Marshalls, and of the Secretaries of the Territories and of their respective Assistants, in the Autumn of the year 1810, together with returns of certain doubtful goods, productions of the Soil and Agricultural Stock, so far as they have been received."

It is well, perhaps, that the clause "so far as they are returned" was inserted, as the reports are exceedingly meager. We give here-with the returns from the different states of all the branches allied to the lumber industry:

CENSUS OF 1810.

The State of Massachusetts, which at that date included what is now the State of Maine, reported nine counties producing cabinet work to a total of \$318,112; four counties reported 1,694 dozen chairs manufactured, valued at \$96,060; four counties reported 37,995 casks made in coopers' shops, valued at \$69,318; two counties reported 150 sawmills, having a product of 11,215,000 feet, valued at \$87,335.

Vermont reported on cabinet work a valuation of \$13,000 from Windsor County and "Seth Whitmore's District," to which latter item was appended a note as follows: "These returns do not mention in what county they are, but as there is no return expressly for Bennington, it is supposed that they belong to that County."

Rhode Island returned but one item—twenty-eight sawmills for Providence County, and New Jersey but one—Essex County, mahogany sawed, \$6,000.

From Pennsylvania, 949 coopers' shops in thirty-one counties, the value of whose product was \$344,687; from forty counties, 2,016 sawmills, producing 74,538,640 feet, valued at \$628,330, including mahogany valued at \$7,800 in Philadelphia, and mahogany valued \$10,000 in Philadelphia County.

Maryland, fifteen cabinetmakers in five counties, value of product, \$8,042; 113 sawmills in four counties.

Virginia, thirty-eight counties reporting \$114,556 value of cabinet work; two counties manufacturing 112 dozen chairs, valued at \$2,025; Richmond City having 394 coopers' shops, the value of whose product was placed at \$7,100; five counties reporting 112 sawmills.

South Carolina, sixty-five sawmills in five counties. Georgia, one sawmill, producing 1,252,000 feet, valued at \$25,400.

Territory of Orleans (that part of the Louisiana Purchase south of the thirty-third parallel of north latitude, now the northern boundary of the State of Louisiana), thirty-four sawmills in seven counties, having a product of 6,790,000 feet, valued at \$339,500.

Territory of Louisiana (that part of the Louisiana Purchase north of the thirty-third parallel), two "districts" reporting nine sawmills. Territory of Indiana, two "divisions" having fourteen sawmills, the product of which was 390,000 feet, valued at \$3,900. Territory of Illinois,

one county reporting five sawmills, having a product of 480,000 feet, valued at \$12,000.

The census is dated and signed as follows: "Philadelphia, in the United States of America. May 30th, 1813. Tench Coxe."

Fragmentary as the returns of that census were, they are capable of being condensed into the following table, showing number of mills, quantity and value of product and value per thousand feet:

CENSUS OF 1810.

STATES AND TERRITORIES.	No. of saw-mills.	Product.		
		Quantity, feet.	Value.	Per M.
Massachusetts.....	150	11,215,000	\$ 87,335	\$ 7.78
Rhode Island.....	28	.....	.....	.....
Pennsylvania.....	2,016	74,538,640	628,330	8.43
Maryland.....	113	.....	.....	.....
Virginia.....	112	.....	.....	.....
South Carolina.....	65	.....	.....	.....
Territory of Orleans.....	34	6,790,000	339,500	50.00
Territory of Louisiana.....	9	.....	.....	.....
Territory of Indiana.....	14	390,000	3,900	10.00
Total.....	2,541	.....	.....	.....

It will be observed that New Hampshire, New York, Connecticut and North Carolina, are entirely lacking, while Vermont made no report as to sawmills. Also, that five made no report as to quantity and value. A curious fact is the average price given for the Territory of Orleans; whether the quantity was too small or the value too high, there is no way to determine. There is some reason to believe that in Pennsylvania the number of saws, and not the number of establishments, was reported.

CENSUS OF 1820.

Of somewhat more value than the census of 1810, was that of 1820, published in 1823. The official title of the publication containing the report is as follows:

DIGEST

OF ACCOUNTS OF MANUFACTURING ESTABLISHMENTS IN THE UNITED STATES AND THEIR MANUFACTURES, MADE UNDER THE DIRECTION OF THE SECRETARY OF STATE, IN PURSUANCE OF A RESOLUTION OF CONGRESS OF 30TH MARCH, 1822.

The resolution referred to provided that a digest of the information secured by the census authorized March 14, 1820, be prepared, and 1,500 copies be printed. While the digest gives much information of value as to industrial and commercial conditions, it is impossible of classification, as will appear. It seems worth while, however, to reproduce the report as far as it relates to lumber, omitting coördinate lines, if for no other reason than to display the crudities of the methods then in use, and the absurdities of their results:

CENSUS OF 1890.

Names of Counties.	Nature and names of the articles annually manufactured.	Market value of the articles annually manufactured.	The kinds of raw material employed.	The quantity of raw materials annually consumed.	The cost of raw materials annually consumed.	Men employed.	Whole quantity and kind of machinery.	Amount of capital invested.	Amount paid annually for wages.	Amount of contingent expenses.	General observations.
DISTRICT OF MAINE.											
Lincoln....	Boards and Scantling	\$ 1,925	Mill Logs	2,300	\$ 1,800	5	5 saws and gear	\$ 2,800	\$ 700	\$ 500	Demand and sales fall off one-half.
	Boards, white pine	\$8 per M. feet.	White pine logs	3,000	400	2	2 saws and 2 wheels	12,000	800	300	The operation full and constant.
DISTRICT OF VERMONT.											
Windsor...	Lumber.	\$ 3,200	White Pine	1,200 logs	\$ 1,300	2	2 saws, etc.	\$ 1,350	\$ 360	\$ 200	In good repair and ready sales.
Ditto.			White Pine, Hemlock, etc.	500,000 feet board measure	2,000	4	1 saw, etc.		620	30	Ditto
NORTHERN DISTRICT OF NEW YORK.											
Broomes...	Lumber.	\$23,760	Logs, etc.		\$10,440	54		\$24,900	\$ 5,985	\$ 870	45 saw mills; no remark made.
	Lumber.				1,850			5,000	795	165	9 saw mills. Annual value of the article manufactured not rendered.
Clinton....	Lumber.	\$62,190	Pine saw logs	38,100 logs	\$20,610	76	52 saw mills, etc.	\$61,150	\$ 9,480	\$ 2,850	5 establishments. In little demand.
Steuben....	Lumber.	\$33,880	Pine logs		\$15,568	77	58 saws.	\$40,120	\$ 5,753	\$ 1,635	
Warren....	Lumber.										1,388 900 feet of boards and plank made. 17 tons made.

Delaware	Lumber.	\$28,525						\$30,445	\$ 1,575	\$ 1,634	There are in the County of Delaware 54 saw mills which annually cut about 5,801,000 feet of boards, plank, scantling, etc., of which about 4,000,000 is of white pine timber and the residue of hemlock and hard timber. These establishments have each but a single saw, except one, and that has two.
Essex.....	Lumber.	\$28,352	White and Yellow Pine	28,500 logs	\$11,070	57	26 mills, etc.	\$34,300	\$ 7,904	\$ 2,360	19 establishments for sawing boards, plank, etc. They appear to be in operation about four months of the year and for that time only are laborers employed. Demand fluctuating and dull at the time of taking the returns.
Montgomery	Lumber as Boards, Scantling, etc.	\$23,292	Pine Logs	18,100 logs	\$13,200	22	31 saws.	\$10,500	\$ 3,115	\$ 1,030	16 establishments: the demand for this article appears to be rather dull.
	Ditto		Ditto	3,200 logs	2,400	3	6 saws, etc.				2 establishments. Ditto.
Otsego.....	Lumber as boards, plank, scantling, etc.	\$ 4,640	Pine, Hemlock, etc.		\$ 1,878	16	Saws, etc.	\$ 6,100	\$ 1,247	\$ 355	9 saw mills.
Saratoga.....	Lumber as boards, scantling, etc.	\$59,405	Pine and Hemlock logs		\$25,867	77	Saw mills.	\$44,812	\$ 8,012	\$ 1,088	8 establishments. The capital invested in one, which manufactures annually to the amount of \$25,000, has not been reported.
	Ditto		Ditto		8,300	6	6 saws.	15,900	804	175	

The accounts of Manufactures in this County, as rendered, must be considered as much less than the Truth warrants. From the absence or reluctance of the owners of these establishments, it was impossible to obtain any information upon the subject.

CENSUS OF 1820.—Continued.

Names of Counties.	Nature and names of the articles annually manufactured.	Market value of the articles annually manufactured.	The kinds of raw material employed.	The quantity of raw materials annually consumed.	The cost of raw materials annually consumed.	Men employed.	Whole quantity and kind of machinery.	Amount of capital invested.	Amount paid annually for wages, etc.	Amount of constant capital expended.	General observations.
WESTERN DISTRICT OF PENNSYLVANIA.											
Allegheny.	Lumber.	\$ 3,600	Pine logs	1,200 logs; 10,000 bu. Grain	\$ 4,700	4	Saw mills, etc.	\$ 8,000	\$ 1,200	\$ 1,000	3 saw mills.
	Lumber and Flour.					5	Steam, grist and saw mills, etc.				
Armstrong.	Lumber.	\$ 1,720	Oak and pine logs			8		\$ 600			
	Ditto		Ditto					940			
Butler....	Lumber	\$ 1,050	Logs			1	1 saw mill, etc.				106,000 feet made.
Erle	Lumber as boards, scantling, etc.		Timber and logs		\$ 1,317	5	3 saw mills, etc.	\$ 2,800	\$ 615	\$ 70	
Jefferson..	Lumber as boards, scantling, etc.	\$ 7,812				18	9 saws, etc.				
Mercer	Lumber as boards, scantling, etc.	\$ 4,540				19	18 saw mills, etc.	\$ 7,250			
Venango...	Lumber as boards, scantling, etc.	\$30,500	Logs			36	18 saws.				
Warren....	Lumber as boards, scantling, etc.	\$55,400	Logs	50,300 logs.	\$22,875	39	34 saws, etc.	\$23,050	\$ 6,440	\$ 1,085	24 establishments. Sales have been dull from the scarcity of money.
EASTERN DISTRICT OF PENNSYLVANIA.											
Schuylkill..	Boards and scantling.	\$ 1,300	Logs, wood	1,240	\$ 450	4	3 saw mills.	\$ 700	\$ 90	\$ 450	

Luzerne...	Flour and Lumber.	Wheat and logs.	24,000 bu. 2,800 logs.	\$17,000	10 pairs stones 2 saw mills	\$21,000	\$2,500	\$650	Lumber, dull sale. Flour better.
	Lumber.	Logs	3,000	800	5 saws	2,500	1,000	200	Dull sales and prices low.
DISTRICT OF MARYLAND.									
Cecil.....	Flour and Timber.	Wheat, corn and timber	49,000 bu. W 3,500 bu. C.	\$58,000	4 saws and flour mch.	\$70,000	\$1,850	\$1,700	
WESTERN DISTRICT OF VIRGINIA.									
Kenhaway	Lumber as plank.	Timber	3,500 logs	\$3,500	6 saw mills	\$16,150	\$2,140	\$1,800	
Tasewell...	Plank, walnut, cherry, poplar.	Timber	6,000 ft.		2 Saw mill	\$100	\$300	\$150	
EASTERN DISTRICT OF VIRGINIA.									
Albemarle.	Lumber	85 to 333 cents per C ft.	855,000 feet.		19 17 mills	\$7,810	\$1,050	\$230	
Bucking- ham.....	Lumber	Trees	27,000 ft. 3,800 trees		7 5 saw mills	\$4,800	\$1,280	\$600	
Orange....	Barrels (flour) Coaches etc. Furniture	\$7,010 Timber Lumber Mahogany etc.	200,000 staves 1,000 ft. 4,000 ft.	\$2,350	20 3 2	\$3,000 2,000 500	\$400 150 200	\$1,500 300 200	There are also 14 grist and saw mills of which no other account is given.
Matthews..	Flour and lumber	\$3,150 Timber	210,000 feet.		5 1 steam saw and grist mill	\$15,000	\$250		This mill grinds only for toll. This County also contains *** 23 saw mills sawing about 925,000 ft. of planks and scantling but no other in- formation received.

CENSUS OF 1820.—Continued.

Names of Counties.	Nature and names of the articles annually manufactured.	Market value of the articles annually manufactured.	The Kinds of raw material employed.	The quantity of raw materials annually consumed.	The cost of raw materials annually consumed.	Men employed.	Whole quantity and kind of machinery.	Amount of capital invested.	Amo't paid annually for wages.	Amo't of contingent expenses.	General observations.
EASTERN DISTRICT OF VIRGINIA—Continued.											
Halifax....	Lumber	\$ 3,530	Timber		\$ 1,310	3	3 flatter wheels etc.	\$ 2,200	\$ 250	\$ 70	
Nansemond....	Lumber Shingles	\$ 1,750 14,400	Timber Juniper timber etc.			80		\$15,000	\$ 900		
DISTRICT OF NORTH CAROLINA.											
Brunswick	Lumber of every description	\$ 4,500	Wood	400,000 ft. superficial	\$ 2,000	16	Steam engine, 70 hp., drawing 24 saws	\$45,000	\$ 3,200	\$ 3,000	
DISTRICT OF GEORGIA.											
Pulaski....	Lumber as plank etc.	\$ 1,192	Wood			4	2 saw mills	\$ 200			Generally in demand.
Jackson....	Lumber as plank etc.		Pine, oaks etc.			18	15 mills saw	\$ 4,200		\$ 810	
Liberty....	Flour and lumber						2 saw mills and 1 grist mill				
Telfair....	Plank etc.		Timber			10					
Morgan....	Lumber as plank etc.	\$ 9,280	Timber etc.			16					
Jones.....		\$ 1,700	Wood etc.	\$ 250	\$ 250	2		\$ 100	\$ 672	\$ 40	
	Lumber as boards etc.	10,150	Pine etc.		1,145	18	9 wheel frames	6,125	1,900	770	

Chatham..	Lumber as plank, scantling etc.	Wood				13	16 hp. steam engine	\$12,000	\$ 4,000	This establishment has a grist mill and cotton gin attached. Demand pretty good.
Columbia.	Lumber as plank etc.	\$ 900								
DISTRICT OF ALABAMA.										
Monroe.....	Lumber	\$12,190	Timber			18	6 saw mills	\$12,000	\$ 1,155	In good demand.
Lawrence..	Lumber as plank, scantling etc.	\$ 6,200	Timber		\$ 750	7	3 saw mills	\$ 7,000	\$ 600	\$ 388
	Lumber and cotton gins	2,500	Timber, iron etc.		750	4	Saw mill, forge etc.	3,500	700	450
DISTRICT OF LOUISIANA.										
Parish.....	Plank		Logs				12 water saw mills			
Parish.....	Plank		Logs				3 saw mills			
Parish.....	Plank		Logs				2 saw mills			
County.....	Plank	\$15,500	Logs		\$ 2,300	9	2 saw mills	\$ 6,000	\$ 1,150	\$ 1,500
County.....	Plank		Logs				1 steam saw mill			
Parish.....	Plank		Logs				3 saw mills			
Parish.....	Plank		Logs			48	6 saw mills, steam			
Parish.....	Plank		Logs				2 saw mills			
Parish.....	Plank		Logs			25	5 saw mills	\$ 1,000 to 4,000		

Parish of St. John Baptiste--2 cart makers, 8 saw mills, 1 per steam, etc. etc.

Parish of New Orleans--11 saw mills, etc. etc.

NOTE: The above returns are in such a confused state that it is impossible to reduce them to the form required by Congress.

CENSUS OF 1920.—Continued.

Names of Counties.	Nature and names of the articles annually manufactured.	Market value of the articles annually manufactured.	The kinds of raw material employed.	The quantity of raw materials annually consumed.	The cost of raw materials annually consumed.	Men employed.	Whole quantity and kind of machinery.	Amount of capital invested.	Amount paid annually for wages.	Amount of contingent expenses.	General observations.
DISTRICT OF EAST TENNESSEE.											
Carter.....	Lumber as boards, scantling etc.	\$13,800	Logs		\$ 1,950	7	6 saw mills	\$ 7,000	\$ 1,200	\$ 145	
Hawkins..	Lumber as boards, scantling etc.					8	Saws etc.	\$ 4,700	\$ 1,162	\$ 280	8 saw mills.
Jefferson..	Plank, scantling etc.	\$ 8,200	Logs		\$ 3,300	11	Saw mills etc.	\$ 4,600	\$ 665	\$ 300	11 establishments.
Sevier.....	Lumber as boards, scantling etc.	\$ 2,130	Logs		\$ 810	5	5 saw mills	\$ 1,500	\$ 575		
DISTRICT OF WEST TENNESSEE.											
Dickson...	Plank and scantling	\$ 1,925	Oak etc. Logs	Uncertain	\$ 900	7	2 flutter wheels, cranks and gudgeons	\$ 200		\$ 200	
Rutherford	Lumber	\$1.50 per M. feet.	Logs	3,000 ft.	\$ 450	1	1 saw mill	\$ 500	\$ 100	\$ 100	
Smith	Lumber						1 steam mill, 2 saws etc.	\$12,000			Idle; out of repair; when in operation demand for its production was good.
Lawrence..	Flour and corn meal with saw mill and blacksmith's shop attached			Stocks for 318,000 feet plank;	\$404,443	3	1 grist mill; 1 saw mill, and 1 blacksmith's shop.	\$ 2,500	\$ 300	\$ 500	
Williamson.....	Lumber	\$ 3,700	Timber	2,400 logs	\$ 1,284	12	2 flutter wheels etc.	\$ 1,470	\$ 150	\$ 92	

DISTRICT OF OHIO.

Ashabula. Lumber	\$7.00 per M. feet.	Logs	1,070	\$ 1,060	4	4 mills, 4 saws and machin- ery	\$ 4,100	\$ 430	145	Demand dull.
Athens.....Lumber	\$ 5,700	Poplar, cherry, oak, maple	1,425 logs	\$ 1,425	12	8 saw mills, 9 saws	\$ 5,300	\$ 1,425	427	Productions in de- mand.
Belmont...Lumber	\$ 625	Timber of various kinds	250 logs		1	1 saw	\$ 600	\$ 40	10	
Butler.....Lumber	\$ 3,000	Logs			1	Saw mill				Boards in demand.
Cham- paign....	\$ 6,625	Poplar, ash, cherry etc.	1,950 logs 200,000 ft.	\$ 1,940	12	11 saw mills—1 saw each	\$10,600	\$ 830	310	
Coshocton	\$ 1,054	Timber	32,300 ft.	\$ 367	2	2 run of saws	\$ 1,100	\$ 210	65	
Cuyahoga.	\$ 5,190	Poplar, cherry, walnut etc.	3,400 logs	\$ 2,295	10	9 saw mills—1 saw each	\$ 6,515	\$ 1,125	215	Sales now dull.
Darke.....	\$ 1,000	Timber		\$ 1,000	1	Mill with 1 saw	\$ 400	\$ 50		
Delaware.	\$ 4,000	Timber	1,975 logs	\$ 1,975	9	5 saw mills	\$ 7,570	\$ 750	260	Ready sale but no cash.
Franklin...	\$ 1,770	Logs			2	2 saw mills	\$ 1,700	\$ 290	15	
Fairfield...		Oak, walnut, cherry, pine	20,000 cu. ft.		3	2 saws	\$ 5,000	\$ 500	150	
Greene....	\$ 8,200	Logs	2,500 logs	\$ 2,800	8	4 saw mills and 5 saws	\$ 6,500	\$ 1,230	690	Demand favorable.
Hamilton.		Flour, meal, lumber, etc.	2,540 logs		42	7 saw mills	\$164,940	\$ 22,256	11,676	
		Lumber of all kinds, flour, whiskey, etc.	3,250 logs, 6,000 bu. grain	\$11,750	13	3 saw mills, 2 run of stones, 2 distilleries, etc.	6,100	3,350	3,150	Demand good for lumber only.
Logan.....	Clear profits \$500.	Timber, oak and cherry	100,000 ft.		3	3 saw mills	\$ 2,450	\$ 330	90	In great demand.

CENSUS OF 1920.—Continued.

Names of Counties.	Nature and names of articles annually manufactured.	Market value of the articles annually manufactured.	The kinds of raw material employed.	The quantity of raw materials annually consumed.	The cost of raw materials annually consumed.	Men employed.	Whole quantity and kind of machinery.	Amount of capital invested.	Amount paid of capital annually for expenses.	General observations.
DISTRICT OF OHIO—Continued.										
Huron....	Boards, plank etc.	\$ 5,810	Logs	3,980	\$ 1,425	11	11 saw mills and apparatus	\$ 8,450	\$ 1,380	\$ 522
Laurence...	Boards, plank etc.	\$1 per C. ft.		370,000 ft.	\$ 5,400	5	3 saw mills	\$ 1,900	\$ 300	\$ 580 Demand good.
Monroe....	Boards and scantling	\$ 1,650	Logs	1,000	\$ 810	5	3 saws etc.	\$ 4,000	\$ 550	\$ 210 Ready sale.
Montgomery	Boards, plank etc.	\$13.504	Logs	5,852	\$ 5,852	14	2 saws etc.	\$12,620	\$ 1,940	\$ 362 Demand not good.
Morgan...	Boards, plank etc.	\$ 4,400	Logs	1,600	\$ 1,600	2	2 water saws	\$ 1,500	\$ 180	\$ 30 Demand brisk.
Muskingum	Boards and scantling	\$ 1,000	Logs	100	\$ 70	2	1 saw	\$ 400	\$ 300	\$ 10 In demand.
	Flour and meal Lumber etc.		Grain, Logs etc.			17	9 run of stones, 3 saws etc.	49,200	2,880	1,470 Lumber is ready sale on credit.
Preble	Boards and scantling	\$ 6,810	Timber	2,820 logs	\$ 3,112	14	14 saw mills	\$ 7,150	\$ 217	Demand considerable.
	Ditto.	2,100	Walnut and poplar	1,000 logs	1,000	4	3 saw mills	3,150		Demand considerable.
Richland...	Boards and scantling	\$ 2,000	Logs	400	\$ 150	3	Saw mill, etc.	\$ 1,500	\$ 400	\$ 20 Demand increasing.
Ross	Boards and scantling	\$ 3,120	Oak, poplar etc.	1,050 logs	\$ 1,250	5	3 saws	\$ 2,000		\$ 95 Sale dull.
Sandusky.	Boards and scantling	\$ 1,000	Logs	500	\$ 500	1	1 saw mill etc.	\$ 2,000	\$ 200	\$ 100

Scioto.....	Boards and scantling	\$ 6,225	Logs	2,060	\$ 1,275	13	7 saw mills	\$ 5,100	\$ 830	170	Ready sales.
	Flour, meal, Lumber etc.		Grain and timber	33,500 bu. 1,025 logs		11	8 run of stones 3 saw mills, etc.	14,700	1,215	240	Good sales for boards.
Tuscara- was.....	Boards and scantling	\$ 2,450	Logs	2,000	\$ 1,050	5	5 saw mills, etc.	\$ 1,900	\$ 435	70	In demand.
Union.....	Boards and scantling	\$ 700	Logs	600	\$ 300	1		\$ 1,500	\$ 150	50	Good demand.
Washing- ton	Boards and scantling	\$1 per C. ft.	Logs	3,800 logs 65,000 ft.	\$ 3,237	21	10 saw mills	\$ 9,500		350	
Wood	Boards and scantling	\$ 800	Logs			1	Saw mill, etc.	\$ 1,000			Demand consider- able.
DISTRICT OF ILLINOIS.											
Monroe....	Flour, whis- key, leather and lumber.				\$ 3,250	3	Merchant mill, saw mill and tanyard.	\$ 9,250	\$ 400	100	
Madison ..	Flour, whis- key and pian.	\$36,900	Wheat, corn and wood		\$ 1,687	6	Grist and saw mill and dis- tillery	\$15,000	\$ 1,200	800	1 establishment.
Union	Boots, shoes, bricks, cabinet furniture, flour, earthenware, hats, leather, plank and sad- dlery	\$18,013					8 mills, etc.				The returns afford no other information than what is stated.
Jackson....	Flour and lum- ber	\$ 2,000	Wheat and wood			4	Grist and saw mill	\$ 6,000			
	Flour and lum- ber					10	Grist and saw mill	7,000			
TERRITORY OF MISSOURI.											
Cape Girardeau.	Boards and scantling						5 saw mills				338,000 feet.
Howard....	Lumber	\$ 8,000	Logs			4	Inclined wheels and 1 saw		\$ 1,800		200,000 feet.

CENSUS OF 1920.—Continued.

Names of Counties.	Nature and names of the articles annually manufactured.	Market value of the articles annually manufactured.	The kinds of raw material employed.	The quantity of raw materials annually consumed.	The cost of raw materials annually consumed.	Men employed.	Whole quantity and kind of machinery.	Amount of capital invested.	Amount paid annually for wages.	Amount of contingent expenses.	General observations.
Territory of Missouri—Continued.											
Madison....	Lumber	\$ 750	Pine, cherry etc.			2	1 saw	\$ 500		\$ 100	50,000 feet made.
St. Genevieve....	Lumber	\$2 per C. ft.	Pine, oak and cherry		\$ 160	8	9 saws	\$ 720	\$ 475		
Territory of Michigan.											
Oakland....	Lumber	\$10,000	Timber		\$ 3,925	7	2 saw mills	\$ 4,300	\$ 9,225	\$ 350	
Crawford....	Lumber	\$ 6,000	Timber		\$ 100	6	1 saw mill	\$ 3,500	\$ 1,000	\$ 500	
Macomb....	Lumber				\$ 1,550	9		\$ 4,400	\$ 650	\$ 450	
Wayne....	Lumber	\$ 500	Pine, oak etc.		\$ 37	2	1 saw etc.	\$ 500	\$ 125	\$ 10	
Territory of Arkansas.											
Arkansas Township.	Various kinds of Timber						Square and round timber at 12½ cents to 17 cents the sq. ft.				The quantity of square and round timber carried to market this year (1920) is much less than formerly owing to large quantities having been taken from the most convenient places on the Mississippi River, and its numerous tributaries, and also to the low price obtained for lumber at New Orleans.
Mississippi T.....	Ditto Wood						50,000 feet Square Timber				
Point Chicot T.....	Ditto						87,000 ft. Square Timber 12½ cents to 17 cents the sq. ft.				
	Ditto						118,000 ft. Round Timber				
St. Francis T.....	Ditto						10,000 ft. Square Timber 12½ cents to 17 cents the sq. ft.				
Fulaski Co.....	Wood Lumber		Logs	1,425 cords 1,500 logs	\$ 487	9	2 saw mills	\$ 900	\$ 700	\$ 300	50,000 ft. sawed and demand for sales of 250,000 feet.

It is evident that it is impossible to determine accurately from the above statements the totals for any state, but, as nearly as may be determined, there were reported sawmills in the various states to the following numbers: New York, 272; Pennsylvania, 88; Virginia, 49; Georgia, 29; Louisiana, 55; Tennessee, 37; Ohio, 136; Illinois, 4; Missouri, 16; Michigan, 4; District of Maine, 7; District of Vermont, 6; Maryland, 4; Alabama, 10, and Territory of Arkansas, 2.

Statistics were given as to furniture and cabinet ware, the wagon, carriage and sleigh industry, cooperage, etc. It is interesting to note that there was not much difference in the uses of woods in 1820 from those which prevailed in 1905. The leading furniture and cabinet wood was mahogany. The expression in answer to the inquiry as to the kinds of raw material employed most frequently used was "mahogany, etc." Next in popularity seemed to be cherry, third walnut, and then poplar, satinwood, whitewood and oak.

CENSUS OF 1840.

The first census prepared with sufficient care to be of any real value was that of 1840, and even in that case the only figures susceptible of tabulation are those relating to the number of sawmills and the value of their product. These figures are given in the following table:

CENSUS OF 1840.

STATES AND TERRITORIES.	Number of sawmills.	Value of product.	STATES AND TERRITORIES.	Number of sawmills.	Value of product.
Alabama.....	524	\$169,008	Mississippi.....	309	\$ 192,794
Arkansas.....	88	176,617	Missouri.....	393	70,855
Connecticut.....	673	147,841	New Hampshire.....	959	433,217
Delaware.....	123	5,562	New Jersey.....	597	271,591
District of Columbia.....	1	.....	New York.....	6,356	3,991,302
Florida.....	65	20,346	North Carolina.....	1,056	506,766
Georgia.....	677	114,050	Ohio.....	2,883	262,821
Illinois.....	785	203,666	Pennsylvania.....	5,389	1,160,220
Indiana.....	1,248	420,791	Rhode Island.....	123	44,465
Iowa.....	75	50,280	South Carolina.....	746	537,684
Kentucky.....	718	130,329	Tennessee.....	977	217,606
Louisiana.....	139	66,106	Vermont.....	1,081	346,839
Maine.....	1,381	1,808,683	Virginia.....	1,987	536,062
Maryland.....	430	226,977	Wisconsin.....	124	202,239
Massachusetts.....	1,252	344,845			
Michigan.....	491	392,325	Total—United States.....	31,650	\$12,943,507

By 1850 the number of states and territories reporting had increased to thirty-six and there had been developed a scheme of inquiry and tabulation substantially the same on the more important items as has prevailed ever since. Consequently, beginning with that census, a series of tables covering the number of establishments, number of wage-earners, wages paid, cost of raw material and value of products can be presented, as has been done in this series:

CENSUS OF 1850.

STATES AND TERRITORIES.	Total number of establishments.	Capital.	Number of wage-earners.	Wages.	Cost of raw material.	Value of products.
Alabama.....	173	\$952,473	937	\$164,268	\$529,978	\$1,103,441
Arkansas.....	66	113,575	275	42,828	31,719	121,918
California.....	10	147,200	114	175,080	38,050	959,435
Connecticut.....	239	308,150	371	97,392	277,831	534,794
Delaware.....	83	158,180	224	50,640	118,322	236,853
District of Columbia.....	1	5,000	14	2,400	22,500	29,000
Florida.....	49	271,400	459	99,072	121,216	391,034
Georgia.....	333	1,008,668	1,221	238,356	377,766	923,408
Illinois.....	468	843,535	1,306	298,524	591,508	1,324,484
Indiana.....	928	1,502,811	2,265	513,216	858,634	2,195,251
Iowa.....	144	204,475	344	81,348	225,135	470,760
Kentucky.....	466	1,029,980	1,490	306,324	731,889	1,592,434
Louisiana.....	138	892,785	948	226,452	273,694	1,129,677
Maine.....	732	3,009,240	4,459	1,301,376	3,609,247	8,872,579
Maryland.....	123	237,850	357	77,892	298,715	585,169
Massachusetts.....	448	1,369,275	1,237	396,576	634,847	1,552,255
Michigan.....	558	1,880,875	2,730	740,076	987,525	2,464,229
Minnesota.....	4	92,000	62	18,300	29,800	57,800
Mississippi.....	259	711,130	1,079	221,628	332,141	913,197
Missouri.....	334	633,109	1,220	289,092	623,518	1,479,124
New Hampshire.....	545	859,305	969	265,068	622,564	1,099,684
New Jersey.....	324	928,500	665	177,180	646,209	1,123,052
New Mexico.....	1	5,000	4	864	10,000	20,000
New York.....	4,625	8,032,983	10,840	2,863,183	6,813,130	13,126,750
North Carolina.....	299	1,057,685	1,135	198,984	480,907	985,073
Ohio.....	1,639	2,600,361	3,756	924,084	1,693,638	3,864,452
Oregon.....	37	536,200	242	331,980	100,000	1,355,500
Pennsylvania.....	2,894	6,913,267	7,052	1,787,520	3,869,358	7,729,058
Rhode Island.....	61	138,700	134	60,252	142,768	241,556
South Carolina.....	353	1,106,033	1,431	203,220	525,844	1,108,880
Tennessee.....	451	797,280	1,229	192,612	293,607	725,287
Texas.....	89	300,075	426	96,912	156,148	466,612
Utah.....	5	12,400	18	.....	.....	14,000
Vermont.....	326	438,025	606	153,288	303,306	618,065
Virginia.....	2	17,000	10	2,460	419,536	877,412
Wisconsin.....	278	1,006,892	1,569	419,340	538,237	1,218,516
Total—United States.....	17,475	\$40,031,417	51,218	\$13,017,792	\$27,593,535	\$58,611,976

It will be noted that the number of establishments, which in 1840 was reported as 31,650, in 1850 was reduced to 17,475. It is probable that the 1840 report included independent shingle mills, cooperage shops, planing mills, etc., in the total, for it is seen that, in spite of the decrease in number of mills, the value of the product increased during that decade over 400 percent. In 1850 the leading state in the lumber industry, measured by value of product, was New York, followed by Pennsylvania, Maine and Ohio in the order named.

The census of 1860 increased the number of states reporting to 39, while New York surrendered its supremacy in the industry of lumber production to Pennsylvania, which led in every item except cost of materials used.

In number of mills Pennsylvania was followed by New York, Ohio, Indiana, Michigan, Maine and Virginia in the order named. In the

value of products Pennsylvania was followed by New York, Michigan, Maine, Ohio, Indiana, California and Missouri in the order named.

The summary table for the census of 1860 is as follows:

CENSUS OF 1860.

STATES AND TERRITORIES.	Number of establishments.	Capital.	Number of wage-earners.	Wages.	Cost of materials used.	Value of products.
Alabama.....	339	\$1,756,947	1,686	\$428,268	\$692,027	\$1,875,628
Arkansas.....	178	583,690	969	268,716	308,187	1,158,902
California.....	295	1,948,327	1,924	1,474,626	1,215,244	4,003,431
Connecticut.....	208	356,800	311	89,878	377,580	589,456
Delaware.....	71	247,760	176	48,132	154,500	276,161
District of Columbia.....	1	20,000	4	1,680	17,000	21,125
Florida.....	87	1,282,000	1,222	316,292	541,531	1,476,645
Georgia.....	411	1,639,717	1,872	438,928	1,311,807	2,414,196
Illinois.....	463	1,446,088	1,798	497,280	1,153,237	2,681,295
Indiana.....	1,331	2,544,538	3,631	1,061,034	1,724,453	4,451,114
Iowa.....	561	1,656,535	1,762	478,080	1,071,285	2,185,206
Kansas.....	124	395,940	497	204,920	538,882	1,563,487
Kentucky.....	482	1,405,835	1,665	439,080	990,021	2,495,820
Louisiana.....	161	1,213,726	1,039	286,956	548,647	1,675,995
Maine.....	926	4,401,482	4,969	1,453,739	4,504,368	7,167,762
Maryland.....	187	472,800	377	101,208	239,808	609,044
Massachusetts.....	611	1,419,473	1,408	421,548	1,570,362	2,353,153
Michigan.....	986	7,735,780	6,980	1,895,162	3,425,613	7,303,404
Minnesota.....	163	1,349,620	1,175	371,988	603,095	1,257,603
Mississippi.....	229	1,049,910	1,441	436,116	653,157	1,832,227
Missouri.....	548	1,809,725	1,753	477,372	1,398,564	3,085,028
Nebraska.....	46	127,800	155	43,648	113,750	335,340
New Hampshire.....	567	1,185,126	1,193	341,160	702,111	1,293,706
New Jersey.....	268	1,163,100	591	188,752	942,706	1,623,160
New Mexico.....	9	45,100	42	14,520	12,950	45,150
New York.....	3,035	7,931,708	8,798	2,368,720	5,531,704	10,597,595
North Carolina.....	349	941,880	1,354	296,952	510,379	1,176,013
Ohio.....	1,911	3,708,153	4,327	1,209,386	2,521,481	5,279,883
Oregon.....	126	430,400	378	210,312	189,925	690,008
Pennsylvania.....	3,078	10,978,464	9,419	2,485,103	5,211,990	10,394,000
Rhode Island.....	26	66,000	79	21,828	46,027	76,114
South Carolina.....	361	1,145,116	1,263	219,361	498,290	1,125,640
Tennessee.....	546	1,492,013	1,867	435,536	880,595	2,228,503
Texas.....	194	1,278,080	1,211	365,376	530,545	1,754,206
Utah.....	28	151,656	67	46,460	61,973	145,505
Vermont.....	415	862,060	939	244,551	477,798	928,541
Virginia.....	784	1,292,886	2,139	464,182	911,714	2,218,962
Washington.....	33	1,168,000	653	383,130	424,671	1,194,360
Wisconsin.....	520	5,785,355	4,708	1,227,385	2,067,816	4,616,430
Total—United States....	20,658	\$74,519,590	75,852	\$21,698,365	\$44,580,773	\$96,699,856

The census of 1870 showed the states and territories as they now are, except that the Dakotas were then still one and that Oklahoma had not been separated from Indian Territory.

At the time of this census the states leading in number of mills were Pennsylvania, New York, Ohio, Indiana, Michigan, Maine, Missouri, New Hampshire, Wisconsin and Tennessee.

In value of products Michigan had come to the front with a valuation of nearly \$32,000,000. Following Michigan were Pennsylvania, New York, Wisconsin, Indiana, Maine and Ohio. The summary of the census of 1870 was as follows:

CENSUS OF 1870.¹

STATES AND TERRITORIES.	Number of establishments.	Capital.	Number of wage-earners.	Wages.	Cost of materials used.	Value of products.
Alabama.....	284	\$744,005	1,428	\$357,195	\$520,513	\$1,359,083
Arizona.....	1	5,000	16	6,000	1,600	10,000
Arkansas.....	211	694,400	1,107	255,186	546,059	1,344,403
California.....	291	3,856,440	4,077	1,620,626	1,986,119	5,227,064
Colorado.....	32	132,700	218	78,711	117,075	324,370
Connecticut.....	393	775,391	908	242,960	940,665	1,541,038
Dakota.....	10	37,400	68	14,256	32,772	72,280
Delaware.....	80	290,424	311	70,823	229,856	405,041
District of Columbia.....	1	1,500	15	1,800	20,000	30,000
Florida.....	104	775,090	1,116	421,820	1,163,238	2,235,780
Georgia.....	532	1,718,473	2,976	667,028	1,616,527	4,044,375
Idaho.....	10	50,750	47	17,024	20,177	56,850
Illinois.....	511	2,542,530	3,100	817,212	2,163,655	4,546,769
Indiana.....	1,861	5,975,746	9,446	1,901,612	5,563,985	12,324,755
Iowa.....	545	3,925,001	3,782	995,962	3,302,782	5,794,285
Kansas.....	195	642,955	1,161	282,662	822,028	1,738,381
Kentucky.....	562	1,724,686	2,497	482,683	1,805,591	3,662,086
Louisiana.....	132	541,800	1,054	284,953	519,938	1,212,037
Maine.....	1,099	6,614,875	8,506	2,448,132	6,872,723	11,395,747
Maryland.....	391	1,055,600	1,245	259,551	674,858	1,501,471
Massachusetts.....	644	2,054,829	2,291	569,300	2,065,375	3,556,670
Michigan.....	1,571	26,990,450	20,058	6,409,233	14,347,661	\$1,946,596
Minnesota.....	207	3,311,140	2,952	880,028	2,193,965	4,299,162
Mississippi.....	265	1,153,917	1,954	580,056	828,793	2,160,667
Missouri.....	806	3,241,670	3,900	1,031,513	3,428,235	6,368,112
Montana.....	31	146,000	161	80,965	172,098	430,957
Nebraska.....	60	152,200	202	47,102	118,975	278,205
Nevada.....	18	193,500	324	153,930	135,450	432,500
New Hampshire.....	723	2,428,193	3,398	725,304	2,471,427	4,286,142
New Jersey.....	285	2,238,900	1,145	369,835	1,612,802	2,745,317
New Mexico.....	12	47,100	63	35,425	40,093	121,235
New York.....	3,510	15,110,981	15,409	3,438,601	11,328,613	21,238,228
North Carolina.....	323	1,175,950	2,361	379,611	970,294	2,000,343
Ohio.....	2,230	6,191,679	8,237	1,535,909	5,038,678	10,235,180
Oregon.....	165	913,262	692	261,785	358,273	1,014,211
Pennsylvania.....	3,739	24,804,304	17,427	5,261,576	14,940,096	28,938,985
Rhode Island.....	81	161,300	204	39,826	187,079	257,258
South Carolina.....	227	583,425	1,212	209,806	581,499	1,197,005
Tennessee.....	702	1,622,741	2,910	578,364	1,446,782	3,390,687
Texas.....	324	870,491	1,750	390,149	644,274	1,960,851
Utah.....	95	338,500	541	139,533	266,047	661,431
Vermont.....	637	2,872,451	2,782	729,925	1,731,516	3,525,122
Virginia.....	605	979,386	2,283	343,823	860,949	2,111,055
Washington.....	46	1,285,202	474	388,830	580,259	1,307,585
West Virginia.....	343	981,950	1,515	349,368	682,180	1,478,399
Wisconsin.....	720	11,448,545	12,461	3,755,089	7,422,866	15,130,719
Wyoming.....	8	110,500	213	104,500	98,000	268,000
Total—United States.....	25,892	\$143,493,232	149,997	\$40,009,162	\$103,343,430	\$210,159,327

¹ For purposes of comparison the values of 1870 should be reduced about twenty percent because of a depreciated currency for that year.

The census of 1880 showed little change in the order, except that the more eastern and the hardwood states, with their smaller but more numerous mills, led in the first column.

In number of establishments the states stood in the following order: Pennsylvania, New York, Ohio, Indiana, Michigan, Virginia, Missouri, Maine, North Carolina, Tennessee and Wisconsin.

In value of products Michigan was emphatically the leader, with its \$52,500,000, followed at a long distance by Pennsylvania, Wisconsin, New York, Indiana and Ohio.

UNITED STATES—LUMBER PRODUCTION.

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CENSUS OF 1890.

STATES AND TERRITORIES.	Number of establishments.	Capital.	Number of wage-earners.	Wages.	Cost of materials used.	Value of products.
Alabama.....	354	\$1,545,655	1,647	\$424,156	\$1,608,635	\$2,649,634
Arizona.....	13	102,450	79	33,375	131,786	215,918
Arkansas.....	319	1,067,840	1,744	237,394	1,070,395	1,793,848
California.....	251	6,454,718	3,434	1,095,736	2,242,503	4,428,950
Colorado.....	96	481,200	877	112,931	700,294	1,051,295
Connecticut.....	300	657,300	707	178,336	641,569	1,076,455
Dakota.....	39	113,750	290	54,974	281,875	435,792
Delaware.....	86	259,250	391	40,694	243,375	411,060
District of Columbia.....	1	25,000	25	6,000	34,000	50,000
Florida.....	135	2,219,550	2,030	562,249	1,867,213	3,060,291
Georgia.....	655	3,101,452	3,392	554,085	3,197,155	4,875,310
Idaho.....	48	192,460	173	33,367	230,566	349,635
Illinois.....	640	3,295,483	3,851	787,867	3,144,905	5,063,037
Indiana.....	2,022	7,048,088	10,339	1,571,740	9,627,097	14,260,830
Iowa.....	325	4,946,390	2,989	825,244	4,141,885	6,185,628
Kansas.....	146	262,975	516	66,757	447,449	682,697
Kentucky.....	670	2,290,558	2,601	671,939	2,410,743	4,064,361
Louisiana.....	175	903,950	976	200,063	1,187,059	1,764,644
Maine.....	848	6,339,396	6,663	1,161,142	4,951,957	7,933,868
Maryland.....	369	1,237,694	1,239	223,786	1,106,795	1,813,332
Massachusetts.....	606	2,480,340	1,070	431,612	1,904,105	3,120,184
Michigan.....	1,649	39,260,428	24,235	6,967,905	32,251,372	52,449,928
Minnesota.....	234	6,771,145	2,854	924,473	4,529,055	7,366,038
Mississippi.....	295	922,595	1,170	197,867	1,219,116	1,920,335
Missouri.....	881	2,867,970	3,503	669,644	3,215,292	5,265,617
Montana.....	36	208,200	142	47,945	278,098	527,685
Nebraska.....	38	93,375	140	29,313	164,878	265,062
Nevada.....	9	132,000	35	8,892	162,810	243,200
New Hampshire.....	680	3,745,790	3,104	548,556	2,372,991	3,842,012
New Jersey.....	284	1,657,395	768	179,693	989,979	1,627,640
New Mexico.....	26	74,675	172	24,240	117,055	173,930
New York.....	2,822	13,230,934	11,445	2,162,972	9,119,263	14,356,910
North Carolina.....	776	1,743,217	3,029	447,431	1,577,139	2,672,796
Ohio.....	2,352	7,944,412	9,317	1,708,300	8,896,106	13,864,480
Oregon.....	228	1,577,875	579	242,154	1,331,342	2,030,463
Pennsylvania.....	2,827	21,418,588	14,914	2,918,459	13,955,430	22,457,359
Rhode Island.....	49	144,250	152	35,143	120,888	240,579
South Carolina.....	420	1,056,265	1,468	221,963	1,237,361	2,031,507
Tennessee.....	755	2,004,503	3,718	549,222	2,142,885	3,744,905
Texas.....	324	1,860,952	3,186	732,914	2,096,775	3,673,449
Utah.....	107	272,750	385	65,175	238,274	375,164
Vermont.....	688	3,274,250	2,511	426,953	2,021,868	3,258,816
Virginia.....	907	2,122,925	4,011	540,231	1,983,777	3,434,163
Washington.....	37	2,456,450	499	200,539	1,188,075	1,734,742
West Virginia.....	472	1,868,920	2,183	459,945	1,375,372	2,431,857
Wisconsin.....	704	19,824,059	8,465	2,257,218	12,471,473	17,952,347
Wyoming.....	7	26,700	38	6,380	27,350	40,990
Total—United States.....	25,708	\$181,186,122	147,956	\$31,845,974	\$146,155,385	\$233,268,729

By the census of 1890 the greatest advance in the value of product had been made by Wisconsin and Minnesota. It was taken near the zenith of the northern pine industry, when those states were rapidly increasing their product. The leading states in value of product were Michigan, Wisconsin, Pennsylvania, Minnesota, Indiana, Washington and New York.

In number of mills Michigan led also, followed by Pennsylvania, New York, Indiana, Ohio and Wisconsin. In capital Michigan was still in the lead, with Wisconsin second. No other state closely approached

them, but since 1900 great advances have been made in the South and West.

CENSUS OF 1900.

STATES AND TERRITORIES.	Number of establishments.	Capital.	Number of wage-earners.	Wages.	Cost of materials used. ¹	Value of products.
Alabama.....	472	\$7,460,108	6,335	\$1,712,336	\$4,551,281	\$8,507,971
Alaska.....	10	105,727	78	18,625	30,198	58,440
Arizona.....	4	212,975	94	57,770	126,765	248,790
Arkansas.....	539	6,928,720	6,563	1,894,395	4,798,377	8,943,052
California.....	258	16,184,235	4,689	1,927,551	4,421,267	8,794,655
Colorado.....	120	941,561	1,156	592,010	647,068	1,363,749
Connecticut.....	176	1,092,586	783	254,926	765,751	1,353,544
Delaware.....	48	265,791	532	96,059	195,346	405,057
Florida.....	215	5,438,366	4,363	1,289,276	2,745,016	5,514,879
Georgia.....	449	5,019,635	5,943	1,533,217	3,304,249	6,545,195
Idaho.....	44	462,130	393	136,195	245,022	631,790
Illinois.....	363	4,095,212	4,089	1,037,525	2,907,390	5,135,155
Indiana.....	1,633	11,387,470	15,021	4,356,196	10,627,901	20,278,023
Indian Territory.....	3	16,000	38	11,800	23,900	41,950
Iowa.....	143	17,530,335	6,819	2,101,648	7,960,286	12,056,302
Kansas.....	27	70,865	102	13,555	43,298	85,521
Kentucky.....	599	6,571,374	6,322	1,588,394	4,376,392	7,904,428
Louisiana.....	127	5,714,313	3,311	1,160,528	3,089,179	5,745,194
Maine.....	894	12,978,315	11,540	2,689,845	6,228,808	11,849,654
Maryland.....	217	1,459,895	1,552	335,909	840,941	1,600,472
Massachusetts.....	488	5,135,860	3,000	1,042,508	2,719,117	5,211,607
Michigan.....	2,124	129,467,072	54,308	15,548,833	49,418,374	83,121,969
Minnesota.....	392	39,442,925	16,170	4,155,522	15,170,349	25,075,132
Mississippi.....	366	4,498,788	4,427	1,169,673	2,867,798	5,770,387
Missouri.....	830	8,245,425	6,703	1,930,504	4,328,903	8,359,925
Montana.....	31	832,948	609	307,617	547,325	1,182,510
Nebraska.....	31	96,539	138	40,497	63,552	154,945
New Hampshire.....	570	7,592,167	5,370	1,600,993	2,607,473	5,641,445
New Jersey.....	114	1,557,508	641	201,751	695,987	1,225,766
New Mexico.....	26	193,335	316	151,725	172,321	389,761
New York.....	1,734	21,430,739	12,981	3,369,484	8,865,653	17,160,547
North Carolina.....	713	5,376,807	6,466	1,202,994	3,038,960	5,898,742
North Dakota.....	5	118,830	135	22,510	36,045	76,173
Ohio.....	1,461	11,806,709	11,727	3,143,494	7,621,133	15,279,843
Oklahoma.....	8	16,605	29	5,170	13,900	27,260
Oregon.....	350	8,103,000	4,214	1,680,618	3,061,439	6,530,757
Pennsylvania.....	1,948	45,107,300	19,598	5,440,480	15,677,103	29,087,970
Rhode Island.....	32	135,156	195	64,697	116,696	264,625
South Carolina.....	352	1,848,155	2,590	420,588	996,289	2,146,750
South Dakota.....	41	251,255	351	91,585	180,757	375,709
Tennessee.....	820	7,259,027	7,424	1,860,008	5,045,906	9,073,686
Texas.....	314	11,175,551	7,485	2,656,119	6,420,878	11,942,566
Utah.....	32	198,248	257	58,901	131,432	249,940
Vermont.....	779	7,789,874	6,054	1,501,776	3,854,670	6,958,674
Virginia.....	663	4,427,627	5,973	1,244,633	2,926,474	5,630,600
Washington.....	462	21,400,307	9,491	4,643,564	8,331,336	17,450,301
West Virginia.....	454	5,086,114	4,182	1,039,530	3,023,297	5,515,065
Wisconsin.....	1,119	105,191,521	41,305	10,712,947	36,649,358	60,966,444
Wyoming.....	17	160,049	102	37,803	52,166	124,462
Total—United States.....	22,617	\$567,881,054	311,964	\$87,934,284	\$242,562,296	\$437,957,382

¹ In 1890 and 1900, for purposes of comparison, "Cost of materials used" includes wages reported under the heads of "Logging" and "Cost of keep of animals."

The Twelfth Census, taken as of June 30, 1900, but in its reports as to industries covering the calendar year of 1899, showed a substantial advance in the totals of every principal item as compared with that of 1890, but marked a decline in the industry of the North, and great gains in the South and West. The summaries are as follows:

UNITED STATES—LUMBER PRODUCTION.

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CENSUS OF 1900 (SAWMILLS, PLANING MILLS OPERATED IN CONNECTION WITH SAWMILLS, AND TIMBER CAMPS).

STATES AND TERRITORIES.	Number of establishments.	Capital.	Average number wage-earners.	Total wages.	Cost of materials used.	Value of products.
Alabama.....	1,111	\$ 13,020,183	12,638	\$ 3,091,821	\$ 4,860,648	\$ 12,867,551
Alaska.....	25	181,950	93	85,252	80,134	211,229
Arizona.....	14	940,698	342	244,850	156,035	547,790
Arkansas.....	1,199	21,727,710	21,302	6,410,843	9,424,347	23,959,983
California.....	313	28,236,332	9,322	4,820,912	4,642,942	13,764,647
Colorado.....	159	972,098	970	441,135	582,695	1,627,605
Connecticut.....	200	1,188,965	1,074	416,290	572,960	1,818,643
Delaware.....	76	354,464	531	127,153	190,365	471,482
Florida.....	416	14,937,693	9,041	2,798,279	4,196,771	10,848,403
Georgia.....	1,254	11,802,716	14,720	3,404,972	4,249,555	13,704,923
Idaho.....	117	913,352	594	262,815	318,249	987,665
Illinois.....	837	5,246,277	4,173	1,570,472	4,194,014	7,652,118
Indiana.....	1,849	10,947,574	11,808	4,465,113	9,822,024	20,613,724
Indian Territory..	49	104,003	209	55,643	66,781	199,879
Iowa.....	264	8,762,219	2,919	1,098,717	5,848,218	8,677,058
Kansas.....	54	85,194	93	28,172	34,027	104,182
Kentucky.....	1,280	9,805,404	9,277	3,015,656	6,201,921	13,774,911
Louisiana.....	432	20,093,044	13,186	4,325,882	7,285,674	17,408,513
Maine.....	838	15,764,538	9,049	3,391,444	6,660,817	13,489,401
Maryland.....	367	2,622,928	2,481	622,874	1,008,690	2,650,082
Massachusetts.....	553	6,253,171	3,463	1,499,661	3,034,828	6,526,230
Michigan.....	1,705	67,379,698	36,900	15,305,722	22,367,102	54,290,520
Minnesota.....	438	52,095,923	20,081	9,451,787	21,345,651	43,585,161
Mississippi.....	844	17,337,538	13,713	3,967,030	6,077,422	15,656,110
Missouri.....	1,197	11,089,799	8,369	2,809,551	4,982,654	11,177,529
Montana.....	139	2,590,224	1,949	1,037,291	916,013	2,949,992
Nebraska.....	23	117,360	39	13,917	20,339	51,773
Nevada.....	4	9,327	6	2,225	1,066	7,060
New Hampshire....	553	11,382,114	6,382	2,383,074	3,496,425	9,218,310
New Jersey.....	205	1,477,930	978	409,282	830,655	1,859,014
New Mexico.....	32	291,599	557	170,290	121,724	411,627
New York.....	1,765	21,873,203	9,243	3,653,383	7,153,962	15,766,977
North Carolina....	1,770	13,885,097	16,149	3,443,805	5,626,605	14,862,598
North Dakota.....	4	27,275	17	4,400	7,037	24,200
Ohio.....	2,054	13,741,418	10,450	4,023,596	9,650,823	20,790,854
Oklahoma.....	33	136,361	49	10,725	25,131	63,569
Oregon.....	436	8,167,433	5,130	2,558,667	4,914,196	10,352,167
Pennsylvania.....	2,338	47,832,548	20,359	8,312,776	14,408,076	35,749,965
Rhode Island.....	33	216,670	182	64,367	70,861	233,579
South Carolina....	729	5,187,727	6,559	1,314,592	1,880,865	5,207,184
South Dakota.....	29	283,720	295	146,350	165,025	445,861
Tennessee.....	1,732	12,900,595	12,980	3,950,524	8,636,752	18,127,784
Texas.....	637	19,161,265	10,962	4,233,096	7,548,680	16,296,473
Utah.....	81	182,780	202	66,326	57,867	214,187
Vermont.....	658	7,051,523	4,743	1,532,957	2,638,050	6,131,808
Virginia.....	1,341	9,299,046	11,031	3,137,853	4,879,077	12,137,177
Washington.....	778	26,041,089	19,143	10,444,731	13,043,512	30,286,280
West Virginia.....	950	10,421,570	7,924	2,665,084	3,959,909	10,612,837
Wisconsin.....	1,066	77,366,223	30,497	12,947,544	28,124,015	57,634,816
Wyoming.....	52	603,956	637	289,017	213,907	831,558
Total—U. S.....	33,035	\$611,611,524	382,840	\$140,327,924	\$246,295,101	\$566,832,984

In order to show in the plainest way the development of each state from 1840, or from the time when it first appeared in the census returns, to 1900, the following tables are presented, which combine sawmills, dependent and independent timber camps and dependent planing mills, and give, as far as possible, the figure regarding the same details as are shown in the decennial tables—number of establishments, capital, number of wage-earners, wages, cost of materials and value of products:

LUMBER INDUSTRY OF AMERICA.

COMPARATIVE CENSUS RETURNS, 1840-1900—SUMMARY BY STATES.

STATES AND TERRITORIES.	Year.	Number of establishments.	Capital.	Number of wage-earners.	Wages.	Cost of materials used. ¹	Value of products.
Alabama.....	1840	524	.....	.....	.....	.....	\$ 169,000
	1850	173	\$ 952,473	957	\$ 164,268	\$ 523,976	1,103,481
	1860	330	1,756,947	1,686	423,268	692,027	1,553,828
	1870	294	744,005	1,423	357,195	620,512	1,253,068
	1880	354	1,545,655	1,647	424,156	1,006,695	2,965,594
	1890	472	7,460,103	6,335	1,712,336	4,551,251	3,507,371
Alaska.....	1900	1,111	12,020,183	9,273	2,265,018	6,646,124	12,867,351
	1890	10	105,727	78	18,625	30,199	58,600
	1900	25	181,950	81	76,968	90,669	211,220
Arizona.....	1870	1	5,000	16	6,000	1,600	10,000
	1880	13	102,450	79	33,375	131,785	213,313
	1890	4	212,975	94	67,770	126,765	268,790
	1900	14	940,603	197	137,510	304,205	567,790
Arkansas.....	1840	85	.....	.....	.....	.....	176,617
	1850	85	113,575	275	42,823	31,719	122,913
	1860	178	583,690	969	263,716	308,137	1,159,362
	1870	211	694,400	1,107	255,186	545,659	1,344,408
	1880	319	1,067,840	1,744	287,394	1,070,395	1,798,543
	1890	589	6,928,720	6,563	1,894,395	4,798,577	8,903,032
	1900	1,199	21,727,710	15,896	4,730,413	13,008,287	28,969,393
California.....	1850	10	147,200	114	175,080	38,050	939,405
	1860	295	1,948,327	1,924	1,474,623	1,215,944	4,008,421
	1870	291	3,356,440	4,077	1,620,623	1,396,119	5,227,094
	1880	251	6,454,713	3,434	1,036,786	2,262,503	4,628,359
	1890	258	16,184,235	4,689	1,927,551	4,421,297	8,794,653
	1900	313	23,236,332	5,306	2,849,457	7,523,215	13,764,647
Colorado.....	1870	32	132,700	218	78,711	117,075	324,370
	1880	95	481,200	877	112,981	700,294	1,051,235
	1890	120	941,561	1,156	392,010	647,058	1,363,740
	1900	159	972,098	732	831,038	854,454	1,627,005
Connecticut.....	1840	673	.....	.....	.....	.....	147,301
	1850	239	308,150	371	97,392	277,331	594,794
	1860	203	336,300	311	89,873	377,530	598,456
	1870	332	775,391	906	242,990	940,635	1,541,038
	1880	300	657,300	707	178,336	641,569	1,076,455
	1890	173	1,092,536	783	254,926	765,751	1,353,544
	1900	200	1,138,935	783	306,915	902,301	1,513,063
Dakota.....	1870	10	37,400	63	14,256	32,772	72,230
	1880	39	113,750	290	54,974	281,375	435,732
	1890	.....	.....	.....	.....	.....	.....
Delaware.....	1840	123	.....	.....	.....	.....	5,520
	1850	63	156,130	224	50,640	118,322	295,353
	1860	71	247,760	176	43,132	154,500	276,131
District of Columbia.....	1870	60	230,424	311	70,823	229,356	405,941
	1880	66	259,250	391	40,794	243,373	411,090
	1890	43	265,791	532	95,059	195,946	405,037
	1900	76	354,464	433	105,033	284,193	471,433
	1840	1	.....	.....	.....	.....	.....
Florida.....	1850	1	5,000	14	2,400	22,500	35,000
	1860	1	20,000	4	1,600	17,000	21,125
	1870	1	1,500	15	1,800	20,000	30,000
	1880	1	25,000	25	6,000	34,000	50,000
Florida.....	1840	65	.....	.....	.....	.....	20,345
	1850	49	271,400	499	99,072	121,216	391,094
	1860	87	1,232,000	1,223	316,232	541,531	1,076,645

¹ In 1890 and 1900, for purposes of comparison, "Cost of materials used" includes wages reported under the heads of "Logging" and "Cost of keep of animals."

² For purposes of comparison the values of 1870 should be reduced about twenty percent because of a depreciated currency for that year.

³ See North Dakota and South Dakota.

UNITED STATES—LUMBER PRODUCTION.

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COMPARATIVE CENSUS RETURNS, 1840-1900—SUMMARY BY STATES—Cont.

STATES AND TERRITORIES.	Year.	Number of establishments.	Capital.	Number of wage-earners.	Wages.	Cost of materials used.	Value of products.
Florida, Cont.	1870	104	\$ 775,090	1,116	\$ 421,830	\$ 1,168,288	\$ 2,285,780
	1880	135	2,219,550	2,080	562,249	1,867,218	3,060,291
	1890	215	5,438,866	4,868	1,289,276	2,745,016	5,514,879
	1900	416	14,387,698	7,061	2,197,876	5,726,887	10,848,408
Georgia.....	1840	677	.....	.....	.....	.....	114,050
	1850	833	1,008,668	1,221	228,366	877,766	928,408
	1860	411	1,689,717	1,872	438,828	1,211,807	2,414,196
	1870	582	1,718,478	2,976	667,628	1,616,527	4,044,875
	1880	665	3,101,452	3,892	654,095	3,197,155	4,875,310
	1890	449	5,019,685	5,943	1,583,217	3,804,249	6,545,195
	1900	1,264	11,802,716	10,240	2,344,528	6,655,897	13,704,928
Idaho	1870	10	50,750	47	17,924	20,177	56,880
	1880	48	192,460	178	33,387	280,566	349,635
	1890	44	462,130	398	136,136	245,022	631,790
	1900	117	913,352	406	180,179	482,200	987,685
Illinois	1840	785	.....	.....	.....	.....	208,686
	1850	468	848,535	1,805	298,524	591,508	1,324,464
	1860	468	1,446,088	1,798	497,280	1,153,237	2,681,295
	1870	511	2,542,580	3,100	817,212	2,168,655	4,546,769
	1880	640	3,295,483	3,851	787,367	3,144,906	5,063,087
	1890	868	4,095,212	4,089	1,087,525	2,907,890	5,185,155
	1900	837	5,246,277	3,526	1,343,640	4,619,705	7,652,118
Indiana.....	1840	1,248	.....	.....	.....	.....	420,791
	1850	928	1,502,311	2,265	513,216	853,684	2,185,351
	1860	1,331	2,544,533	3,631	1,001,084	1,734,483	4,451,114
	1870	1,361	5,975,746	9,446	1,901,612	5,563,885	12,324,755
	1880	2,022	7,048,088	10,339	1,571,740	9,627,097	14,280,880
	1890	1,638	11,887,470	15,021	4,356,196	10,627,601	20,278,028
	1900	1,849	10,947,574	9,508	3,606,982	11,316,001	20,618,724
Indian Territory.....	1890	3	16,000	88	11,800	23,900	41,950
	1900	49	104,008	173	48,498	81,792	198,379
Iowa	1840	75	.....	.....	.....	.....	50,280
	1850	144	204,475	844	81,843	225,135	470,760
	1860	561	1,656,585	1,762	478,080	1,071,285	2,185,208
	1870	545	3,925,001	3,732	936,932	3,302,782	5,794,285
	1880	828	4,946,390	2,989	825,244	4,141,885	6,185,623
	1890	143	17,580,835	6,819	2,101,643	7,960,286	12,066,302
	1900	264	3,762,219	2,793	1,046,181	6,324,034	8,677,058
Kansas.....	1860	124	395,940	497	204,920	588,862	1,568,487
	1870	195	642,955	1,161	282,632	822,028	1,786,381
	1880	146	262,975	516	66,757	447,449	682,697
	1890	27	70,865	102	13,555	43,298	85,521
	1900	54	85,194	76	22,897	43,251	104,183
Kentucky.....	1840	718	.....	.....	.....	.....	130,329
	1850	466	1,029,980	1,490	306,324	721,889	1,592,434
	1860	432	1,405,835	1,665	439,080	990,021	2,495,820
	1870	532	1,724,696	2,497	482,698	1,805,591	3,662,086
	1880	670	2,290,558	2,601	671,989	2,410,743	4,064,361
	1890	599	6,571,374	6,322	1,568,394	4,375,392	7,904,428
	1900	1,280	9,805,404	7,549	2,477,696	7,379,148	13,774,911
Louisiana.....	1840	139	.....	.....	.....	.....	66,106
	1850	138	892,785	943	225,452	273,694	1,129,677
	1860	161	1,213,726	1,089	286,956	543,647	1,575,995
	1870	152	541,800	1,054	284,953	519,988	1,212,037
	1880	175	903,950	976	200,083	1,187,059	1,764,644
	1890	127	5,714,313	3,311	1,160,523	3,089,179	5,745,194
	1900	432	20,093,044	10,171	3,337,020	9,449,678	17,406,513
Maine.	1840	1,331	.....	.....	.....	.....	1,308,688
	1850	732	3,009,240	4,439	1,301,376	3,009,247	5,872,573
	1860	926	4,401,482	4,969	1,453,789	4,504,368	7,167,762
	1870	1,099	6,614,375	8,506	2,449,132	6,872,723	11,395,747
	1880	843	6,339,396	6,668	1,161,142	4,951,957	7,963,368
	1890	894	12,978,315	11,540	2,689,845	6,228,806	11,849,654
	1900	883	15,764,538	6,834	2,633,771	7,904,595	13,489,401

COMPARATIVE CENSUS RETURNS, 1840-1900—SUMMARY BY STATES—Cont.

STATES AND TERRITORIES.	Year.	Number of establishments.	Capital.	Number of wage-earners.	Wages.	Cost of materials used.	Value of products.
Maryland	1840	430	\$ .....	.....	\$ .....	\$ .....	\$ 226,977
	1850	123	237,850	.....	77,892	228,715	583,128
	1860	187	472,800	357	101,308	229,808	699,046
	1870	391	1,055,600	1,245	259,551	674,836	1,501,471
	1880	369	1,237,694	1,239	223,786	1,166,795	1,813,332
	1890	217	1,459,895	1,552	335,909	840,941	1,890,472
Massachusetts.....	1900	367	2,622,928	1,964	476,776	1,390,357	2,630,082
	1840	1,252	.....	.....	.....	.....	341,845
	1850	448	1,369,275	1,237	396,576	834,647	1,532,365
	1860	611	1,419,473	1,408	421,548	1,570,322	2,363,153
	1870	644	2,054,829	2,291	569,300	2,063,376	3,556,870
	1880	606	2,490,340	1,970	431,612	1,904,166	3,120,184
Michigan.....	1890	488	5,135,860	3,000	1,042,608	2,719,117	5,211,807
	1900	553	6,253,171	2,768	1,215,086	3,574,418	6,636,230
	1840	491	.....	.....	.....	.....	382,135
	1850	558	1,880,875	2,730	740,076	967,523	2,464,723
	1860	986	7,735,780	6,980	1,895,162	3,425,613	7,303,401
	1870	1,571	26,990,450	20,058	6,400,283	14,347,061	31,946,356
Minnesota	1880	1,649	39,360,428	24,235	6,967,905	32,351,372	52,449,923
	1890	2,124	129,467,072	54,308	15,543,833	49,418,374	83,121,369
	1900	1,705	67,379,698	26,199	11,122,030	29,439,931	54,200,539
	1850	4	92,000	62	18,300	23,800	57,800
	1860	163	1,949,620	1,175	371,968	603,099	1,237,632
	1870	207	3,311,140	2,952	880,028	2,193,965	4,239,162
Mississippi.....	1880	234	6,771,145	2,854	924,473	4,529,033	7,594,633
	1890	392	39,442,926	16,170	4,155,522	15,170,349	25,673,132
	1900	438	52,095,923	15,140	7,140,571	26,047,761	42,583,161
	1840	809	.....	.....	.....	.....	192,794
	1850	259	711,130	1,079	221,628	332,141	912,107
	1860	229	1,049,910	1,441	436,116	653,157	1,332,327
Missouri.....	1870	265	1,153,917	1,954	580,056	828,759	2,160,067
	1880	295	922,595	1,170	197,867	1,219,114	1,590,233
	1890	366	4,498,788	4,427	1,169,673	2,867,796	6,778,337
	1900	844	17,337,583	9,676	2,700,780	8,422,323	13,634,119
	1840	393	.....	.....	.....	.....	70,33
	1850	394	633,169	1,220	299,092	629,515	1,072,131
Montana	1860	548	1,809,725	1,753	477,372	1,398,564	3,063,033
	1870	806	3,241,670	3,900	1,031,513	3,428,235	6,362,112
	1880	881	2,867,970	3,503	669,644	3,213,292	5,063,017
	1890	630	8,245,425	6,703	1,930,504	4,328,903	6,339,936
	1900	1,197	11,089,799	6,043	2,612,659	6,410,210	11,137,130
	1840	81	146,000	.....	.....	.....	400,32
Nebraska.....	1850	86	208,200	161	80,965	172,058	327,165
	1860	81	832,948	142	47,945	278,098	437,165
	1870	139	2,590,224	609	307,617	547,325	1,132,530
	1880	46	127,800	1,191	637,924	1,665,536	2,948,328
Nevada.....	1890	50	152,200	155	43,648	113,750	333,330
	1880	38	93,875	202	47,102	118,979	273,335
	1870	31	96,539	140	29,313	164,879	365,02
	1860	23	117,360	138	40,497	63,362	154,96
	1850	18	193,500	31	10,727	27,120	61,73
New Hampshire.....	1840	9	132,000	324	153,900	125,450	332,100
	1850	4	9,327	35	9,892	162,310	243,39
	1860	.....	.....	4	1,375	3,234	7,00
New Jersey.....	1840	959	.....	.....	.....	.....	431,377
	1850	845	859,305	969	265,068	622,564	1,093,492
	1860	867	1,185,126	1,195	341,160	702,111	1,218,730
	1870	723	2,428,193	3,998	725,304	2,471,427	4,288,162
	1880	630	3,745,790	3,104	548,556	2,272,991	3,802,032
	1890	570	7,592,167	5,370	1,600,908	2,607,473	5,861,445
New York.....	1900	553	11,382,114	4,188	1,654,965	4,927,399	9,235,430
	1840	597	.....	.....	.....	.....	271,181
	1850	324	928,500	665	177,180	646,209	1,123,032
New York.....	1860	268	1,163,100	591	188,762	942,706	1,623,100

UNITED STATES—LUMBER PRODUCTION.

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COMPARATIVE CENSUS RETURNS, 1840-1900—SUMMARY BY STATES—Cont.

STATES AND TERRITORIES.	Year.	Number of establishments.	Capital.	Number of wage-earners.	Wages.	Cost of materials used.	Value of products.
New Jersey, Cont.	1870	285	\$ 2,288,900	1,145	\$ 869,885	\$ 1,612,802	\$ 2,745,817
	1880	284	1,657,895	768	179,698	989,979	1,627,640
	1890	114	1,557,508	641	201,751	695,967	1,225,766
	1900	205	1,477,980	708	805,486	998,161	1,859,014
	1850	1	5,000	4	864	10,000	20,000
New Mexico.....	1880	9	45,100	42	14,520	12,950	45,150
	1870	12	47,100	68	85,425	40,083	121,225
	1890	24	74,675	172	24,240	117,055	178,980
	1890	28	198,885	816	151,725	172,821	889,761
	1900	82	291,599	840	112,957	212,571	411,627
New York.....	1840	6,856	.....	.....	.....	.....	3,891,802
	1850	4,625	8,082,968	10,840	2,868,188	6,818,180	18,126,759
	1860	3,085	7,981,708	8,798	2,869,720	5,581,704	10,597,595
	1870	8,510	15,180,961	15,409	8,488,601	11,228,613	21,228,228
	1880	2,822	18,280,934	11,445	2,162,972	9,119,268	14,856,910
	1890	1,734	21,430,739	12,981	8,869,484	8,865,658	17,180,547
	1900	1,765	21,878,208	6,850	2,787,861	9,068,425	15,766,977
	1840	1,056	.....	.....	.....	.....	506,766
North Carolina.....	1850	299	1,057,685	1,135	198,984	480,907	985,076
	1860	849	941,880	1,354	295,952	510,879	1,176,018
	1870	823	1,175,950	2,861	379,611	970,294	2,000,243
	1880	776	1,743,217	3,029	447,481	1,577,189	2,672,792
	1890	712	5,876,807	6,466	1,202,994	8,088,980	6,898,742
	1900	1,770	13,865,097	11,761	2,491,069	7,743,285	14,862,598
	1890	5	118,880	185	22,510	86,045	76,178
	1900	4	27,275	12	8,000	11,582	24,200
Ohio	1840	2,888	.....	.....	.....	.....	282,821
	1850	1,639	2,600,861	8,756	924,084	1,698,686	3,864,452
	1860	1,911	8,708,158	4,827	1,209,886	2,521,481	5,279,858
	1870	2,230	6,191,679	8,237	1,535,909	5,068,678	10,235,180
	1880	2,362	7,944,412	9,817	1,708,300	8,896,106	12,864,480
	1890	1,461	11,806,709	11,727	8,143,494	7,621,138	15,279,843
	1900	2,064	18,741,418	8,589	8,298,668	11,296,045	20,790,864
	1890	8	16,605	29	5,170	18,900	27,280
Oklahoma.....	1900	38	186,361	43	9,475	27,621	68,569
Oregon.....	1850	87	586,200	242	331,980	190,000	1,855,500
	1860	125	430,400	378	210,812	189,925	690,008
	1870	165	918,262	692	261,785	858,278	1,014,211
	1880	228	1,577,875	579	242,154	1,831,842	2,080,468
	1890	850	8,108,000	4,214	1,690,618	8,061,489	6,580,757
	1900	436	8,167,433	4,084	2,023,914	5,727,720	10,352,167
	1840	5,889	.....	.....	.....	.....	1,150,220
	1850	2,894	6,913,257	7,052	1,787,520	3,869,558	7,729,058
Pennsylvania.....	1860	8,078	10,978,464	9,419	2,485,108	5,211,980	10,994,080
	1870	8,789	24,804,304	17,427	5,261,576	14,940,086	28,988,985
	1880	2,827	21,418,588	14,914	2,918,459	13,965,480	22,457,359
	1890	1,948	45,107,300	19,598	5,440,480	15,677,108	29,087,970
	1900	2,338	47,882,548	13,510	5,550,168	20,777,869	35,749,965
	1840	128	.....	.....	.....	.....	44,455
	1850	51	138,700	134	60,252	142,768	241,556
	1860	26	66,000	79	21,828	46,027	76,114
Rhode Island.....	1870	81	161,200	204	39,826	157,079	257,258
	1880	49	144,250	152	33,143	120,888	240,579
	1890	32	135,156	195	64,697	116,696	264,625
	1900	35	216,670	128	43,280	124,973	233,579
South Carolina.....	1840	746	.....	.....	.....	.....	587,684
	1850	358	1,106,083	1,431	208,220	525,844	1,108,880
	1860	861	1,145,116	1,263	219,861	496,290	1,125,640
	1870	227	568,425	1,212	209,806	581,499	1,197,005
	1880	420	1,056,285	1,468	221,983	1,237,361	2,081,507
	1890	852	1,848,155	2,500	420,588	996,289	2,146,759
	1900	729	5,137,727	4,585	897,899	2,629,805	5,207,184

COMPARATIVE CENSUS RETURNS, 1840-1900—SUMMARY BY STATES—Cont.

STATES AND TERRITORIES.	Year.	Number of establishments.	Capital.	Number of wage-earners.	Wages.	Cost of materials used.	Value of products.
South Dakota.....	1880	41	\$ 251,255	351	\$ 91,585	\$ 89,757	\$ 215,700
	1900	29	293,720	181	92,425	258,355	445,081
Tennessee.....	1840	977	.....	.....	.....	.....	277,008
	1850	451	707,280	1,229	192,512	268,807	725,367
	1860	546	1,492,018	1,867	435,586	880,585	2,528,508
	1870	702	1,622,741	2,910	578,364	1,446,782	3,300,067
	1880	755	2,004,508	3,718	649,222	2,162,865	3,744,905
	1890	820	7,256,027	7,424	1,880,008	5,045,908	9,073,800
	1900	1,782	12,900,595	11,192	3,424,510	10,008,275	18,127,704
Texas.....	1850	89	800,075	426	95,912	156,149	405,021
	1860	194	1,278,080	1,211	365,876	580,545	1,754,280
	1870	324	870,491	1,750	390,149	644,274	1,980,251
	1880	324	1,680,952	3,186	782,914	2,088,776	3,673,469
	1890	814	11,175,551	7,485	2,656,119	6,420,878	11,942,586
	1900	687	19,161,265	7,924	3,004,917	9,668,343	16,286,673
Utah.....	1860	5	12,400	18	.....	.....	14,639
	1870	28	151,656	80	46,480	61,978	145,595
	1880	95	338,500	541	139,533	298,047	661,461
	1890	107	272,750	385	65,175	288,274	875,104
	1890	82	198,248	257	58,901	131,432	283,398
	1900	81	182,780	140	43,504	102,362	214,187
Vermont.....	1840	1,081	.....	.....	.....	.....	244,380
	1850	326	438,025	606	153,268	306,306	613,685
	1860	415	862,080	989	244,551	477,798	928,541
	1870	687	2,872,451	2,782	729,925	1,731,516	3,556,122
	1880	698	3,274,250	2,511	426,958	2,021,868	3,358,516
	1890	779	7,789,874	6,054	1,501,776	3,854,670	6,968,674
	1900	658	7,051,523	3,625	1,184,904	3,877,131	6,131,838
Virginia.....	1840	1,967	.....	.....	.....	.....	598,002
	1850	2	17,000	10	2,480	419,586	977,412
	1860	784	1,292,886	2,189	464,182	911,714	2,218,982
	1870	605	979,386	2,283	343,828	860,949	2,111,055
	1880	907	2,122,925	4,011	540,231	1,968,777	3,434,108
	1890	663	4,427,627	5,973	1,244,683	2,926,474	5,680,800
	1900	1,841	9,299,046	7,611	2,144,382	6,763,881	12,137,177
Washington.....	1860	33	1,168,000	653	363,130	424,671	1,194,389
	1870	46	1,285,202	474	368,630	580,269	1,307,555
	1880	87	2,456,450	499	200,539	1,188,078	1,784,742
	1890	462	21,400,307	9,491	4,643,564	8,331,336	17,459,301
	1900	778	26,041,089	15,696	3,511,224	16,455,553	30,208,280
West Virginia.....	1870	343	981,950	1,515	349,308	632,180	1,478,389
	1880	472	1,669,920	2,183	459,945	1,375,372	2,431,357
	1890	454	5,086,114	4,182	1,039,530	3,022,297	5,515,065
	1900	950	10,421,570	5,827	1,623,558	5,584,717	10,512,637
Wisconsin.....	1840	124	.....	.....	.....	.....	202,339
	1850	278	1,006,892	1,569	.....	.....	1,218,516
	1860	520	5,785,355	4,703	419,340	588,337	4,616,609
	1870	720	11,448,545	12,461	1,227,386	2,067,816	15,180,719
	1880	704	19,824,069	8,465	3,755,069	7,422,868	17,982,947
	1890	1,119	105,191,521	41,305	2,257,218	12,471,473	60,306,444
	1900	1,066	77,806,223	21,701	10,712,947	36,449,558	57,694,516
Wyoming.....	1870	8	110,500	213	104,500	35,199,409	281,000
	1880	7	26,700	88	6,380	27,350	40,300
	1890	17	180,049	102	87,808	62,166	124,462
	1900	52	608,956	559	256,025	297,475	601,556

Taking up each item in the summary tables, a series of tables by states and years is presented. These show the changes from decade to decade in number of establishments, capital invested, wage-earners employed, wages paid and value of products, by states. The table relating to number of establishments is as follows:

NUMBER OF ESTABLISHMENTS.

STATES AND TERRITORIES.	1840.	1850.	1860.	1870.	1880.	1890.	1900.
Alabama.....	524	173	339	284	354	473	1,111
Alaska.....						10	25
Arizona.....				1	13	4	14
Arkansas.....	88	66	178	211	319	539	1,199
California.....		10	295	291	251	258	313
Colorado.....				32	96	130	159
Connecticut.....	673	239	206	393	300	176	200
Dakota.....				10	39	(¹)	(¹)
Delaware.....	123	83	71	80	86	49	76
District of Columbia.....	1	1	1	1	1		
Florida.....	65	49	97	104	135	215	416
Georgia.....	677	333	411	532	655	449	1,254
Idaho.....				10	48	44	117
Illinois.....	785	468	463	511	640	365	837
Indiana.....	1,248	928	1,331	1,861	2,022	1,633	1,849
Indian Territory.....						8	49
Iowa.....	76	144	561	545	328	143	264
Kansas.....			124	195	145	27	54
Kentucky.....	718	466	482	562	670	599	1,280
Louisiana.....	139	138	161	152	175	127	432
Maine.....	1,381	732	926	1,099	848	894	838
Maryland.....	430	123	187	391	369	217	367
Massachusetts.....	1,252	448	611	644	606	488	553
Michigan.....	491	558	986	1,571	1,649	2,124	1,705
Minnesota.....		4	163	207	234	392	438
Mississippi.....	309	259	329	365	395	366	844
Missouri.....	393	334	548	806	881	830	1,197
Montana.....				31	36	31	139
Nebraska.....			46	50	38	31	23
Nevada.....				18	9		4
New Hampshire.....	959	545	567	723	690	570	553
New Jersey.....	597	324	268	285	284	114	206
New Mexico.....		1	9	12	26	26	32
New York.....	6,356	4,625	3,035	3,510	2,822	1,734	1,765
North Carolina.....	1,056	299	349	523	776	713	1,770
North Dakota.....				(²)	(²)	5	4
Ohio.....	2,883	1,639	1,911	2,230	2,352	1,461	2,054
Oklahoma.....						8	33
Oregon.....		37	126	165	228	350	436
Pennsylvania.....	5,389	2,894	3,073	3,739	2,827	1,948	2,338
Rhode Island.....	123	51	26	81	49	32	35
South Carolina.....	746	353	361	227	420	352	729
South Dakota.....				(⁴)	(⁴)	41	29
Tennessee.....	977	451	546	702	755	820	1,732
Texas.....		89	194	324	324	314	687
Utah.....		5	28	95	107	32	81
Vermont.....	1,081	326	415	637	688	779	659
Virginia.....	1,987	2	784	605	907	663	1,341
Washington.....			33	46	37	462	778
West Virginia.....	(⁵)	(⁵)	(⁵)	343	472	454	950
Wisconsin.....	124	278	520	720	704	1,119	1,066
Wyoming.....				8	7	17	52
Total—United States.....	31,650	17,475	20,658	25,832	25,708	22,617	33,085

¹ See North Dakota and South Dakota. ² See Dakota. ³ Part of Indian Territory prior to 1890. ⁴ See Dakota. ⁵ Included in Virginia.

The number of establishments has shown much less increase than capital, wages and product. This is due chiefly to improvements in

sawmill machinery and in transportation facilities, both of which have aided in concentrating the industry in large establishments.

A remarkable increase is noted in the capital invested in the lumber industry, especially from 1880 to 1890. That decade witnessed a wonderful development of the northern pine industry and also the real beginning of development in the southern pine states west of Georgia.

AMOUNT OF CAPITAL INVESTED.

STATES AND TERRITORIES.	1850.	1860.	¹ 1870.	1880.	1890.	1900.
Alabama.....	\$962,473	\$1,756,947	\$744,006	\$1,545,655	\$7,460,108	\$13,020,193
Alaska.....					105,727	181,950
Arizona.....			5,000	102,450	212,975	940,698
Arkansas.....	113,575	583,690	694,400	1,067,840	6,928,720	21,727,710
California.....	147,200	1,948,327	3,856,440	6,454,718	16,184,235	28,226,332
Colorado.....			132,700	481,200	941,361	972,098
Connecticut.....	308,150	386,800	775,391	657,900	1,092,584	1,138,905
Dakota.....			37,400	113,750	(²)	(³)
Delaware.....	158,180	247,760	290,424	259,250	265,791	354,484
District of Columbia.....		20,000	1,500			
Florida.....	271,400	1,282,000	775,090	2,219,550	6,438,366	14,937,693
Georgia.....	1,008,668	1,639,717	1,718,473	3,101,452	5,019,635	11,802,716
Idaho.....			50,750	192,460	462,130	913,332
Illinois.....	843,535	1,446,068	2,542,530	3,295,483	4,086,212	5,246,277
Indiana.....	1,502,811	2,544,638	5,975,746	7,048,088	11,367,470	10,947,574
Indian Territory.....					16,000	104,003
Iowa.....	204,475	1,656,635	3,925,001	4,946,390	17,530,335	8,762,219
Kansas.....		396,040	642,955	202,975	70,865	85,194
Kentucky.....	1,029,980	1,405,835	1,724,696	2,290,558	6,571,374	9,805,404
Louisiana.....		1,213,726	541,800	903,950	6,714,312	20,093,044
Maine.....	3,009,240	4,401,482	6,614,875	6,339,396	12,978,315	15,764,538
Maryland.....	237,850	472,800	1,055,600	1,237,694	1,439,895	2,622,928
Massachusetts.....	1,360,275	1,419,473	2,054,829	2,480,340	5,135,860	6,250,171
Michigan.....	1,880,875	7,735,780	26,900,450	39,260,428	129,467,072	67,379,698
Minnesota.....	92,000	1,349,020	3,311,140	6,771,145	39,442,925	52,085,929
Mississippi.....	711,130	1,049,910	1,153,917	922,595	4,498,788	17,837,538
Missouri.....	633,109	1,809,725	3,241,670	2,867,970	8,245,425	11,088,799
Montana.....			146,000	208,200	882,948	2,590,224
Nebraska.....		127,800	152,200	93,375	96,539	117,360
Nevada.....			198,500	132,000		9,327
New Hampshire.....	859,305	1,185,126	2,428,193	3,745,790	7,592,167	11,282,114
New Jersey.....	928,500	1,163,100	2,238,900	1,657,395	1,557,508	1,477,930
New Mexico.....	5,000	46,100	47,100	74,675	193,335	291,599
New York.....	8,082,983	7,981,708	15,110,981	13,230,994	21,430,739	21,873,202
North Carolina.....	1,057,685	941,880	1,175,950	1,743,217	5,376,807	13,385,097
North Dakota.....			(³)	(³)	118,530	27,375
Ohio.....	2,600,361	8,708,153	6,191,679	7,944,412	11,806,709	13,741,418
Oklahoma.....					16,605	186,361
Oregon.....	536,200	430,400	913,262	1,577,875	8,103,000	8,167,403
Pennsylvania.....	6,913,267	10,978,464	24,804,304	21,418,588	45,107,300	47,632,545
Rhode Island.....	138,700	66,000	161,300	144,250	135,156	216,670
South Carolina.....	1,106,038	1,145,116	583,425	1,056,265	1,848,155	5,137,727
South Dakota.....			(⁵)	(⁵)	251,255	283,720
Tennessee.....	707,250	1,492,013	1,622,741	2,004,503	7,259,027	12,900,596
Texas.....	300,076	1,278,060	870,491	1,660,952	11,175,551	19,181,265
Utah.....	12,400	151,656	338,500	272,750	198,245	182,780
Vermont.....	438,025	862,000	2,872,451	3,274,250	7,789,574	7,051,523
Virginia.....	17,000	1,292,886	979,386	2,122,925	4,427,627	9,299,046
Washington.....		1,168,000	1,285,202	2,456,450	21,400,307	26,041,089
West Virginia.....		(⁶)	981,950	1,668,920	5,086,114	10,421,570
Wisconsin.....	1,006,892	5,785,355	11,448,545	19,824,059	105,191,521	77,366,223
Wyoming.....			110,500	26,700	160,048	600,956
Total—United States.....	\$40,031,417	\$74,519,590	\$143,493,232	\$181,186,122	\$557,881,054	\$611,611,324

¹ For purposes of comparison the values of 1870 should be reduced about twenty percent because of a depreciated currency for that year. ² See North Dakota and South Dakota. ³ See Dakota. ⁴ Part of Indian Territory prior to 1890. ⁵ See Dakota. ⁶ Included in Virginia.

In number of wage-earners employed the invention and application of labor-saving machinery has promoted an actual reduction, coincident with a large increase in product. The changes in this item are shown by the following table:

TOTAL NUMBER OF WAGE-EARNERS.

STATES AND TERRITORIES.	1850.	1860.	1870.	1880.	1890.	1900.
Alabama.....	937	1,686	1,428	1,647	6,335	9,273
Alaska.....					78	81
Arizona.....			16	79	94	197
Arkansas.....	275	969	1,107	1,744	6,563	15,895
California.....	114	1,924	4,077	3,434	4,689	5,806
Colorado.....			218	577	1,166	732
Connecticut.....	371	311	908	707	783	788
Dakota.....			68	290	(1)	(1)
Delaware.....	224	176	311	391	532	433
District of Columbia.....	14	4	15	25		
Florida.....	499	1,222	1,116	2,030	4,363	7,081
Georgia.....	1,221	1,872	2,976	3,392	5,943	10,240
Idaho.....			47	173	393	406
Illinois.....	1,306	1,798	3,100	3,851	4,089	3,526
Indiana.....	2,265	3,631	9,446	10,339	15,021	9,503
Indian Territory.....					88	173
Iowa.....	344	1,762	3,782	2,989	6,819	2,798
Kansas.....		497	1,161	516	102	76
Kentucky.....	1,490	1,665	2,497	2,601	6,222	7,549
Louisiana.....	948	1,039	1,054	976	3,311	10,171
Maine.....	4,439	4,969	8,506	6,863	11,540	6,834
Maryland.....	357	877	1,245	1,239	1,552	1,964
Massachusetts.....	1,237	1,408	2,291	1,970	3,000	2,768
Michigan.....	2,730	6,980	20,058	24,235	54,308	26,199
Minnesota.....	62	1,175	2,952	2,854	16,170	15,140
Mississippi.....	1,079	1,441	1,954	1,170	4,427	9,876
Missouri.....	1,220	1,753	3,900	3,503	6,703	6,043
Montana.....			161	142	609	1,191
Nebraska.....		155	202	140	138	31
Nevada.....			324	35		4
New Hampshire.....	969	1,195	3,398	3,104	5,370	4,188
New Jersey.....	665	591	1,145	768	641	706
New Mexico.....	4	42	63	172	316	340
New York.....	10,840	8,798	15,409	11,445	12,981	6,850
North Carolina.....	1,135	1,354	2,361	3,029	6,466	11,751
North Dakota.....			(2)	(2)	135	13
Ohio.....	3,756	4,327	8,237	9,317	11,727	8,539
Oklahoma ³					29	43
Oregon.....	242	378	692	579	4,214	4,084
Pennsylvania.....	7,052	9,419	17,427	14,914	19,598	13,510
Rhode Island.....	134	79	204	152	195	123
South Carolina.....	1,431	1,263	1,212	1,466	2,590	4,585
South Dakota.....			(4)	(4)	351	181
Tennessee.....	1,229	1,867	2,910	3,718	7,424	11,192
Texas.....	426	1,211	1,750	3,186	7,485	7,924
Utah.....	18	80	541	385	257	140
Vermont.....	606	939	2,782	2,511	6,054	3,625
Virginia.....	10	2,139	2,283	4,011	5,973	7,611
Washington.....		653	474	499	9,491	15,696
West Virginia.....	(5)	(5)	1,515	2,183	4,182	5,327
Wisconsin.....	1,569	4,703	12,461	8,465	41,305	21,701
Wyoming.....			218	38	102	559
Total—United States.....	51,218	75,852	149,997	147,956	311,964	283,260

¹ See North Dakota and South Dakota.

² See Dakota.

³ Part of Indian Territory prior to 1890.

⁴ See Dakota.

⁵ Included in Virginia.

Notwithstanding the decrease or small increase in number of wage-earners, the rate of wages has, during the last two decades, increased

materially. In 1880 the average wage was \$215.24, in 1890 it was \$281.87 and in 1900 it was \$369.42. It should be mentioned, however, that prior to 1900 the total of wages paid in the lumber industry was not accurately obtained.

TOTAL WAGES.

STATES AND TERRITORIES.	1850.	1860.	1870.	1880.	1890.	1900.
Alabama.....	\$164,268	\$428,268	\$357,195	\$424,156	\$1,712,536	\$1,265,918
Alaska.....					18,625	76,960
Arizona.....			6,000	83,376	57,770	137,810
Arkansas.....	42,828	268,716	255,186	237,394	1,894,366	4,730,413
California.....	175,080	1,474,626	1,620,626	1,098,706	1,927,551	2,940,437
Colorado.....			78,711	112,931	302,010	351,038
Connecticut.....	97,392	89,878	242,990	178,236	254,920	300,915
Dakota.....			14,256	54,974	(5)	(5)
Delaware.....	50,640	48,132	70,823	40,694	96,069	105,008
District of Columbia.....	2,400	1,680	1,800	6,000		
Florida.....	99,072	316,292	421,820	562,249	1,389,276	2,137,553
Georgia.....	238,356	438,828	667,628	564,085	1,533,217	2,944,528
Idaho.....			17,924	136,196	186,196	180,179
Illinois.....	298,524	497,280	817,212	83,867	1,037,525	1,842,640
Indiana.....	513,216	1,001,034	1,901,612	787,867	4,856,196	8,008,992
Indian Territory.....				1,571,740	11,800	46,498
Iowa.....	81,348	478,080	995,962	2,101,648	1,046,281	2,137,553
Kansas.....		204,920	282,662	825,244	13,555	22,807
Kentucky.....	306,324	439,080	482,653	66,757	1,568,394	2,477,886
Louisiana.....	236,452	286,956	284,953	671,909	1,169,528	3,337,028
Maine.....	1,301,376	1,453,739	2,449,132	200,063	2,689,846	2,682,771
Maryland.....	77,892	101,208	259,551	1,161,142	335,999	478,775
Massachusetts.....	390,576	421,548	569,300	223,786	1,042,508	1,135,088
Michigan.....	740,076	1,895,162	6,400,283	431,612	15,548,393	11,122,000
Minnesota.....	18,300	371,988	880,028	6,967,905	4,158,822	7,149,571
Mississippi.....	221,628	496,116	580,056	924,473	1,169,673	2,733,736
Missouri.....	289,092	477,372	1,031,513	197,867	1,980,504	2,012,640
Montana.....			80,965	669,644	807,617	637,561
Nebraska.....		43,648	47,102	47,945	29,313	10,727
Nevada.....			153,930	9,892		1,255
New Hampshire.....	265,068	341,160	725,304	549,556	1,030,993	1,854,905
New Jersey.....	177,180	188,752	369,835	179,688	201,751	368,486
New Mexico.....	864	14,520	85,425	24,340	181,725	112,937
New York.....	2,863,188	2,360,720	3,438,601	3,869,484	3,869,484	2,737,361
North Carolina.....	198,984	296,952	579,611	2,162,972	1,202,994	2,491,080
North Dakota.....			(3)	447,431	22,510	1,000
Ohio.....	924,084	1,209,386	1,535,909	(3)		
Oklahoma ¹				1,708,300	3,143,494	8,328,065
Oregon.....	331,980	210,312	261,785		5,170	9,675
Pennsylvania.....	1,787,520	2,485,108	5,261,576	242,154	1,680,618	2,023,914
Rhode Island.....	60,252	21,828	89,826	2,918,459	6,440,480	5,536,165
South Carolina.....	208,220	219,361	209,806	33,143	64,697	63,280
South Dakota.....			(5)	221,963	420,588	897,399
Tennessee.....	192,612	435,536	578,364	(5)	91,585	92,425
Texas.....	96,912	365,376	390,149	549,222	1,930,066	3,424,510
Utah.....		46,460	139,533	752,914	2,664,119	3,094,917
Vermont.....	153,238	244,551	729,925	65,175	58,901	43,904
Virginia.....	2,460	464,182	343,823	426,953	1,501,778	1,184,904
Washington.....		383,130	388,830	540,231	1,244,638	2,144,832
West Virginia.....	(6)	(6)	349,363	200,539	4,643,564	8,511,221
Wisconsin.....	419,340	1,227,385	3,755,089	459,945	1,089,530	1,826,568
Wyoming.....			104,500	2,257,218	10,712,947	9,480,011
Total—United States.....	\$13,017,792	\$21,698,365	\$40,009,162	6,380	\$31,845,974	\$87,504,284
						\$104,640,587

¹ For purposes of comparison the values of 1870 should be reduced about twenty percent because of a depreciated currency for that year.

² See North Dakota and South Dakota.

³ See Dakota.

⁴ Part of Indian Territory prior to 1890.

⁵ See Dakota.

⁶ Included in Virginia.

In value of products there has been a remarkable increase from census to census, only during the last decade any important lumber producing states having shown a material decline, those declines being confined to northern pine territory.

VALUE OF PRODUCTS.

STATES AND TERRITORIES.	1840.	1850.	1860.	¹ 1870.	1880.	1890.	1900.
Alabama.....	\$169,008	\$1,108,481	\$1,875,628	\$1,359,083	\$2,649,634	\$8,507,971	\$12,867,551
Alaska.....						58,440	211,229
Arizona.....				10,000	215,918	248,790	547,790
Arkansas.....	176,617	122,918	1,158,902	1,344,403	1,793,848	8,948,082	23,959,983
California.....		959,485	4,003,431	5,227,064	4,428,950	8,794,655	13,764,647
Colorado.....				324,370	1,051,295	1,363,749	1,627,605
Connecticut.....	147,841	534,794	589,456	1,541,038	1,076,455	1,853,544	1,818,643
Dakota.....				72,280	435,792	(2)	(2)
Delaware.....	5,562	236,863	276,161	405,041	411,050	405,057	471,482
Dist. of Columbia.....		29,000	21,125	30,000	50,000		
Florida.....	20,946	391,064	1,476,645	2,235,780	3,060,291	5,514,879	10,848,403
Georgia.....	114,050	923,403	2,414,196	4,044,375	4,875,310	6,545,195	13,704,923
Idaho.....				56,850	849,635	631,790	937,665
Illinois.....	203,666	1,324,484	2,681,295	4,546,769	5,063,637	5,135,155	7,652,118
Indiana.....	420,791	2,195,351	4,451,114	12,324,755	14,260,830	20,278,023	20,613,724
Indian Territory.....						41,960	199,879
Iowa.....	50,280	470,760	2,185,206	5,794,285	6,185,628	12,056,302	8,677,058
Kansas.....			1,563,487	1,736,381	682,697	85,521	104,182
Kentucky.....	130,329	1,592,434	2,495,820	3,662,086	4,064,361	7,904,428	13,774,911
Louisiana.....	66,106	1,129,677	1,575,995	1,212,037	1,764,644	5,745,194	17,408,513
Maine.....	1,808,683	5,872,573	7,167,762	11,395,747	7,933,868	11,849,654	13,489,401
Maryland.....	226,977	688,168	609,044	1,501,471	1,813,332	1,600,472	2,650,082
Massachusetts.....	844,845	1,552,265	2,353,153	3,556,870	3,120,184	5,211,607	6,526,230
Michigan.....	392,325	2,464,329	7,303,404	31,946,396	52,449,928	88,121,969	54,290,520
Minnesota.....		57,800	1,257,603	4,299,182	7,866,088	25,075,132	43,585,161
Mississippi.....	192,794	913,197	1,832,227	2,160,667	1,920,335	5,770,387	15,656,110
Missouri.....	70,355	1,479,124	3,085,026	6,363,112	5,265,617	8,359,925	11,177,529
Montana.....				430,957	527,695	1,182,510	2,949,992
Nebraska.....			335,340	278,205	265,062	154,945	51,773
Nevada.....				432,500	243,200		7,060
New Hampshire.....	433,217	1,099,492	1,293,706	4,286,142	3,842,012	5,641,445	9,218,310
New Jersey.....	271,591	1,123,052	1,623,160	2,745,317	1,627,640	1,225,766	1,859,014
New Mexico.....		20,000	45,150	121,225	173,980	389,761	411,627
New York.....	3,891,302	13,126,759	10,587,595	21,238,228	14,356,910	17,160,547	15,766,977
North Carolina.....	506,766	985,075	1,176,013	2,000,243	2,672,798	5,898,742	14,862,593
North Dakota.....				(3)	(3)	76,173	24,200
Ohio.....	262,821	3,864,452	5,279,883	10,235,180	13,864,460	15,279,843	20,790,854
Oklahoma.....						27,260	63,569
Oregon.....		1,355,500	600,008	1,014,211	2,030,463	6,530,757	10,352,167
Pennsylvania.....	1,150,220	7,729,058	10,994,060	28,938,985	22,457,359	29,067,970	35,749,965
Rhode Island.....	44,455	241,556	76,114	257,258	240,579	264,625	233,579
South Carolina.....	537,684	1,108,880	1,125,640	1,197,005	2,031,507	2,146,750	5,207,184
South Dakota.....				(5)	(5)	375,709	445,861
Tennessee.....	217,606	725,387	2,228,503	3,890,687	3,744,905	9,073,686	18,127,784
Texas.....		466,012	1,754,206	1,960,851	3,673,449	11,942,566	16,296,473
Utah.....		14,620	145,505	661,431	375,164	249,940	214,187
Vermont.....	346,939	618,065	928,541	3,525,122	3,258,816	6,958,674	6,131,808
Virginia.....	538,092	977,412	2,218,962	2,111,055	3,434,163	5,630,600	12,137,177
Washington.....			1,194,360	1,307,585	1,734,742	17,450,301	30,286,280
West Virginia.....				1,478,399	2,431,857	5,515,065	10,612,837
Wisconsin.....	202,239	1,218,516	4,616,430	15,130,719	17,352,347	60,966,444	57,634,816
Wyoming.....				268,000	40,990	124,462	331,558
Total-United States.....	\$12,943,507	\$58,611,976	\$96,699,856	\$210,159,327	\$233,268,729	\$487,957,332	\$566,832,984

¹ For purposes of comparison the values of 1870 should be reduced about twenty percent because of a depreciated currency for that year.

² See North Dakota and South Dakota.

³ See Dakota.

⁴ Part of Indian Territory prior to 1890.

⁵ See Dakota.

Most complete in its details and exact in its methods was the Twelfth Census; and because it was the latest census available for this work, its returns, relating to lumber and associated industries, are given at length. The three tables which next follow relate to the sawmills and planing mills operated in connection with them and to timber camps, the figures being aggregated to cover the lumber producing industry proper:

STATISTICAL SUMMARY OF SAWMILLS, PLANING MILLS (OPERATED IN CONNECTION WITH SAWMILLS) AND TIMBER CAMPS OF THE UNITED STATES, BY STATES, CENSUS OF 1900.

STATES AND TERRITORIES.	Number of establishments.	Capital.	Miscellaneous expenses.	Cost of materials used.	VALUE OF PRODUCTS.	
					Total.	Sawmill.
Alabama.....	1,111	\$13,020,183	\$ 471,111	\$ 4,660,648	\$12,807,551	\$10,514,249
Alaska.....	25	181,950	12,280	80,134	211,229	95,449
Arizona.....	14	940,698	18,322	156,035	547,790	411,833
Arkansas.....	1,199	21,727,710	1,149,025	9,424,347	23,959,983	17,306,562
California.....	813	28,236,332	771,329	4,642,942	13,764,647	8,729,654
Colorado.....	159	972,098	80,257	582,095	1,627,605	1,290,000
Connecticut.....	200	1,188,985	146,721	572,960	1,816,643	1,304,304
Delaware.....	76	354,484	6,315	190,985	471,482	401,042
Florida.....	418	14,937,693	848,458	4,196,771	10,848,403	8,493,424
Georgia.....	1,254	11,802,716	281,504	4,249,555	13,704,923	11,601,361
Idaho.....	117	913,352	29,787	318,249	937,665	641,868
Illinois.....	837	5,246,277	321,956	4,194,014	7,652,118	5,624,331
Indiana.....	1,849	10,947,574	601,823	9,822,024	20,813,724	18,745,545
Indian Territory	49	104,003	2,778	68,781	199,979	194,504
Iowa.....	264	8,762,219	694,325	5,848,218	8,677,058	5,264,931
Kansas.....	54	85,194	3,827	34,027	104,182	101,264
Kentucky.....	1,280	9,805,404	644,275	6,201,921	13,774,911	11,846,565
Louisiana.....	432	20,068,044	1,000,742	7,285,674	17,408,513	12,074,065
Maine.....	838	15,764,538	738,455	6,660,817	13,489,401	11,476,563
Maryland.....	367	2,622,928	163,378	1,008,690	2,630,982	2,286,248
Massachusetts.....	553	6,253,171	371,852	3,094,828	6,526,230	5,087,493
Michigan.....	1,705	67,379,698	3,266,221	22,367,102	54,290,520	42,517,495
Minnesota.....	438	52,095,923	3,103,389	21,345,651	43,585,161	25,891,210
Mississippi.....	844	17,337,538	636,058	6,077,422	15,686,110	12,136,498
Missouri.....	1,197	11,089,799	527,267	4,982,654	11,177,529	8,892,000
Montana.....	139	2,890,224	66,688	916,018	2,949,992	2,291,289
Nebraska.....	23	117,330	830	20,839	51,773	51,373
Nevada.....	4	9,847	269	1,036	7,060	7,060
New Hampshire.....	583	11,582,114	358,102	3,496,425	9,215,510	6,728,754
New Jersey.....	205	1,477,890	57,712	830,655	1,859,014	1,276,014
New Mexico.....	32	291,398	8,188	121,724	411,627	290,527
New York.....	1,765	21,873,203	835,060	7,153,962	15,766,977	11,676,620
North Carolina.....	1,770	13,385,097	633,149	5,626,605	14,862,593	11,782,101
North Dakota.....	4	27,275	86	7,037	24,200	21,800
Ohio.....	2,064	13,741,418	938,710	9,650,823	20,790,854	17,306,294
Oklahoma.....	33	136,361	1,459	25,131	63,569	63,569
Oregon.....	436	8,167,433	376,640	4,814,196	10,352,167	6,883,234
Pennsylvania.....	2,338	47,632,548	2,743,351	14,408,076	35,749,965	28,516,776
Rhode Island.....	85	216,670	20,981	70,861	233,579	186,813
South Carolina.....	728	5,187,737	121,908	1,880,865	5,207,184	4,233,679
South Dakota.....	29	283,730	8,035	165,035	445,861	292,938
Tennessee.....	1,732	12,900,595	729,179	8,636,752	18,127,784	15,222,933
Texas.....	637	19,161,265	612,980	7,548,690	16,296,473	10,532,438
Utah.....	81	182,790	3,293	57,867	214,187	189,562
Vermont.....	659	7,051,523	263,876	2,638,050	6,131,808	4,306,936
Virginia.....	1,341	9,299,046	545,056	4,879,077	12,187,177	9,969,057
Washington.....	778	26,041,099	1,421,520	13,043,512	30,286,280	19,617,179
West Virginia.....	950	10,421,570	630,206	3,959,909	10,612,887	8,390,518
Wisconsin.....	1,066	77,366,223	4,263,605	28,124,015	57,634,816	39,944,711
Wyoming.....	52	603,956	6,698	213,907	831,558	285,567
Total—U. S.....	33,035	\$611,611,524	\$30,539,036	\$246,295,101	\$566,832,984	\$422,812,061

UNITED STATES—LUMBER PRODUCTION.

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STATISTICAL SUMMARY OF SAWMILLS, PLANING MILLS (OPERATED IN CONNECTION WITH SAWMILLS) AND TIMBER CAMPS OF THE UNITED STATES,
BY STATES, CENSUS OF 1900.

STATES AND TERRITORIES.	Proprietors and firm members.	Salaried officials, clerks, etc.		Average number of wage-earners and total wages.			
				Total.		Men, 16 years and over.	
		Number.	Salaries.	Average number.	Total wages.	Average number.	Total wages.
Alabama.....	1,516	494	\$ 367,229	12,636	\$ 3,091,821	12,216	\$ 3,063,800
Alaska.....	85	14	7,810	98	85,252	98	85,252
Arizona.....	13	22	33,560	342	244,350	330	240,650
Arkansas.....	1,565	878	682,545	21,302	6,410,848	21,077	6,371,454
California.....	385	887	427,242	9,322	4,320,912	9,222	4,586,982
Colorado.....	201	47	38,487	970	441,136	958	436,726
Connecticut.....	249	38	20,396	1,074	416,290	1,074	416,290
Delaware.....	105	2	900	581	127,158	486	122,586
Florida.....	587	416	337,406	9,041	2,798,279	8,896	2,776,344
Georgia.....	1,697	468	297,402	14,720	8,404,972	14,588	8,391,071
Idaho.....	141	28	14,240	594	262,316	586	261,415
Illinois.....	1,106	138	116,084	4,173	1,670,472	4,012	1,541,625
Indiana.....	2,471	428	329,547	11,808	4,466,113	11,708	4,448,158
Indian Territory..	65	4	967	209	55,643	207	55,253
Iowa.....	827	147	175,768	2,919	1,098,717	2,808	1,061,234
Kansas.....	68	.....	.....	98	28,172	92	28,022
Kentucky.....	1,699	365	266,879	9,277	8,015,656	9,118	2,989,550
Louisiana.....	522	636	617,759	13,186	4,325,882	13,077	4,306,829
Maine.....	1,112	812	262,344	9,049	3,391,444	8,990	3,378,788
Maryland.....	474	87	44,437	2,481	622,574	2,235	602,918
Massachusetts.....	685	97	82,596	3,463	1,499,661	3,408	1,484,740
Michigan.....	2,161	1,467	1,413,518	36,900	15,306,722	36,886	15,196,768
Minnesota.....	543	715	884,222	20,081	9,451,787	20,028	9,439,116
Mississippi.....	1,099	538	453,244	13,718	3,967,080	13,694	3,964,766
Missouri.....	1,614	275	235,431	8,389	2,809,561	8,282	2,782,115
Montana.....	178	49	60,906	1,949	1,067,291	1,948	1,067,061
Nebraska.....	80	.....	.....	89	18,917	86	18,386
Nevada.....	4	.....	.....	6	2,225	6	2,225
New Hampshire.....	681	141	104,987	6,382	2,383,074	6,300	2,365,418
New Jersey.....	246	32	23,384	978	409,282	976	406,982
New Mexico.....	36	12	8,200	557	170,290	556	170,165
New York.....	2,161	887	806,104	9,243	3,653,393	9,144	3,635,988
North Carolina.....	2,426	482	328,729	16,149	3,443,805	15,919	3,416,631
North Dakota.....	6	1	300	17	4,400	17	4,400
Ohio.....	2,800	375	309,686	10,459	4,023,596	10,322	3,999,610
Oklahoma.....	46	1	600	49	10,725	49	10,725
Oregon.....	596	250	229,101	5,180	2,558,667	5,037	2,537,650
Pennsylvania.....	3,078	579	481,405	20,859	8,312,776	20,186	8,284,082
Rhode Island.....	38	4	1,825	182	64,367	181	64,249
South Carolina.....	918	252	150,999	6,559	1,314,592	6,519	1,310,379
South Dakota.....	24	16	13,820	295	146,356	295	146,356
Tennessee.....	2,486	447	370,543	12,980	3,950,524	12,820	3,898,129
Texas.....	845	426	409,113	10,962	4,238,096	10,921	4,225,577
Utah.....	106	7	1,850	202	66,826	192	65,208
Vermont.....	815	91	56,193	4,743	1,532,957	4,604	1,514,280
Virginia.....	1,789	415	280,038	11,081	3,137,853	10,664	3,108,050
Washington.....	978	743	743,918	19,143	10,444,781	19,050	10,416,710
West Virginia.....	1,334	296	233,044	7,924	2,665,064	7,863	2,654,210
Wisconsin.....	1,284	1,326	1,343,501	30,497	12,947,544	29,977	12,837,527
Wyoming.....	77	18	10,495	637	289,017	637	289,017
Total—U. S.....	43,322	14,383	\$12,520,143	382,940	\$140,327,924	377,480	\$139,428,499

**STATISTICAL SUMMARY OF SAWMILLS, PLANING MILLS (OPERATED IN CONNECTION WITH SAWMILLS) AND TIMBER CAMPS OF THE UNITED STATES,
BY STATES, CENSUS OF 1900.**

STATES AND TERRITORIES.	Value of products.		Sawed lumber.					
	Planing mill.	Timber camp.	Total.		Merchant.		Custom.	
			Quantity M feet board measure.	Value.	Quantity M feet board measure.	Value.	Quantity (estimated) M feet board measure.	Value, (estimated)
Alabama.....	\$ 2,080,427	\$ 272,775	1,101,386	\$ 9,833,239	1,036,841	\$ 9,262,377	64,545	\$ 570,862
Alaska.....	69,462	46,318	6,571	89,249	6,571	89,249	.....	.....
Arizona.....	108,567	30,400	36,182	407,308	36,122	406,588	80	720
Arkansas.....	6,308,419	448,611	1,623,987	14,160,571	1,601,510	13,951,546	22,477	209,025
California.....	3,916,512	1,118,481	737,035	7,823,897	729,850	7,754,872	7,185	69,025
Colorado.....	299,521	48,084	133,746	1,269,806	132,746	1,258,522	1,000	10,784
Connecticut.....	152,997	361,342	108,093	1,614,701	78,993	1,152,140	29,110	462,561
Delaware.....	56,700	13,740	35,955	395,828	27,556	316,707	8,299	79,121
Florida.....	1,758,738	596,241	790,373	7,853,462	782,677	7,786,452	7,896	67,019
Georgia.....	1,650,062	453,500	1,311,917	11,355,532	1,257,468	10,932,272	54,449	423,360
Idaho.....	172,257	123,540	65,363	614,188	62,238	581,394	3,125	32,254
Illinois.....	1,774,983	252,804	988,469	5,049,663	336,891	4,434,282	51,578	615,331
Indiana.....	1,556,243	311,936	1,036,999	16,818,041	853,479	14,154,157	185,520	2,662,884
Indian Ter.....	4,375	1,000	15,985	167,480	14,559	149,328	1,426	15,152
Iowa.....	3,389,020	23,107	352,411	5,146,785	328,168	4,789,069	24,243	337,725
Kansas.....	.....	2,918	10,665	146,180	5,826	74,540	4,839	71,640
Kentucky.....	1,577,636	350,710	774,651	10,045,547	682,691	8,994,720	91,960	1,050,827
Louisiana.....	4,664,832	669,626	1,115,366	10,916,954	1,107,876	10,859,901	7,490	57,058
Maine.....	1,704,702	308,136	784,647	9,256,158	701,787	8,347,909	82,860	906,249
Maryland.....	2,464,463	79,381	183,711	2,036,716	159,523	1,774,001	24,188	262,715
Mass'ch's'ts.....	1,243,408	225,339	344,190	4,005,845	273,858	3,180,402	70,332	826,443
Michigan.....	5,822,481	5,950,544	3,018,338	35,865,616	2,648,247	31,612,301	370,091	4,253,315
Minnesota.....	12,069,993	5,623,958	2,342,338	28,637,800	1,858,612	22,731,828	483,726	5,905,972
Mississippi.....	3,305,365	214,257	1,206,265	11,665,152	1,173,109	10,552,144	33,156	313,008
Missouri.....	1,577,348	318,281	723,754	8,011,022	643,187	7,113,585	80,567	897,437
Montana.....	450,728	207,975	255,685	2,297,860	247,666	2,221,496	6,019	76,364
Nebraska.....	.....	400	4,655	54,831	4,220	49,511	435	5,230
Nevada.....	.....	.....	725	7,060	725	7,060	.....	.....
New Hamp.....	1,423,563	1,067,993	572,447	6,544,136	495,758	5,730,163	76,689	813,973
New Jersey.....	423,788	159,212	74,118	1,233,323	57,549	945,533	16,569	287,790
New Mexico.....	17,960	103,150	30,880	289,401	27,802	260,915	3,078	28,486
New York.....	3,993,544	696,813	878,448	12,364,362	685,373	8,907,359	193,075	3,457,003
N. Carolina.....	2,760,410	320,082	1,286,638	11,067,909	1,135,028	10,371,778	91,610	696,131
N. Dakota.....	2,400	.....	2,030	22,060	2,000	21,700	30	360
Ohio.....	2,854,510	630,050	990,497	15,820,989	768,903	12,756,868	221,594	3,064,071
Oklahoma.....	.....	.....	6,119	69,374	4,626	53,688	1,493	15,566
Oregon.....	2,703,466	735,467	734,538	6,691,214	732,906	6,675,623	1,632	15,361
Pennsylvania.....	3,869,589	3,372,000	2,333,278	27,476,411	2,125,518	24,946,209	207,760	2,530,232
Rhode Island.....	1,733	46,583	18,528	226,919	13,737	165,951	4,791	60,968
S. Carolina.....	826,381	127,133	466,429	3,903,009	446,416	3,781,460	20,013	151,549
S. Dakota.....	113,783	39,140	31,704	299,188	29,133	275,278	2,571	23,910
Tennessee.....	2,624,585	278,266	950,958	11,882,596	825,196	10,372,328	125,762	1,460,268
Texas.....	5,196,849	566,186	1,232,404	10,197,575	1,214,013	10,041,982	18,391	155,643
Utah.....	15,225	9,400	17,548	209,308	14,183	170,883	3,365	38,425
Vermont.....	1,845,156	79,716	375,809	4,294,276	307,370	3,508,219	68,439	786,057
Virginia.....	1,817,534	419,586	959,119	9,379,689	883,571	8,642,277	75,548	737,412
Washington.....	5,180,545	6,488,556	1,420,032	12,291,046	1,411,080	12,142,903	17,952	148,143
W. Virginia.....	763,336	458,683	778,051	9,185,416	682,921	8,141,940	95,130	1,043,476
Wisconsin.....	15,449,096	2,241,009	3,389,166	41,302,531	2,776,662	38,956,433	612,504	7,346,696
Wyoming.....	34,966	611,025	16,963	213,200	15,483	194,580	1,480	18,620
Total—U. S.	\$107,622,519	\$36,398,404	35,084,166	\$390,489,873	31,508,214	\$347,402,903	3,575,952	\$43,046,570

The sawmill furnishes the most important of the figures which go to make up the totals in the preceding tables. The following table is a summary, by states, of the principal figures relating to sawmills. In

UNITED STATES—LUMBER PRODUCTION.

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the table on page 506, 33,035 establishments were included; of them 31,833 were sawmills, the remainder being timber camps. The summary of sawmills, by states, is as follows:

SAWMILLS—SUMMARY BY STATES, 1900.
 [Separated from planing mills and timber camps.]

STATES AND TERRITORIES.	Number of establishments.	Capital.	Salaried employees.		Wage-earners.		Value of product.
			Number.	Salaries.	Number.	Wages.	
Alabama.....	1,087	\$ 5,708,312	347	\$ 276,118	7,858	\$ 1,933,038	\$ 10,514,349
Alaska.....	17	99,300	13	7,250	63	59,106	95,449
Arizona.....	14	363,876	15	23,794	180	126,073	411,833
Arkansas.....	1,142	10,534,242	744	592,161	15,273	3,859,932	17,306,562
California.....	285	8,351,543	283	308,798	4,385	2,120,281	8,729,654
Colorado.....	155	601,872	41	35,413	625	282,617	1,290,000
Connecticut.....	187	667,047	29	15,753	681	267,513	1,304,304
Delaware.....	76	247,367	1	200	411	99,801	401,042
Florida.....	368	6,104,352	326	271,950	5,678	1,770,010	8,493,424
Georgia.....	1,201	5,133,630	360	238,030	8,705	2,019,459	11,601,361
Idaho.....	114	542,505	19	13,006	362	160,176	641,868
Illinois.....	825	3,147,593	111	92,440	2,890	1,102,135	5,624,331
Indiana.....	1,829	8,293,433	387	301,737	8,924	3,394,106	18,745,545
Indian Territory.....	48	91,718	4	957	168	47,238	194,504
Iowa.....	264	4,985,726	104	124,650	1,560	583,519	5,264,931
Kansas.....	54	57,806	.....	.....	76	22,897	101,264
Kentucky.....	1,232	5,738,461	309	241,015	6,768	2,231,037	11,846,565
Louisiana.....	405	10,453,713	492	485,473	7,568	2,519,406	12,074,055
Maine.....	832	9,779,413	239	212,605	6,290	2,425,425	11,476,563
Maryland.....	366	1,333,229	68	36,037	1,825	442,787	2,286,248
Massachusetts.....	534	4,014,837	85	74,848	2,439	1,073,090	5,057,483
Michigan.....	1,613	33,760,292	1,062	1,055,960	22,105	9,253,991	42,517,495
Minnesota.....	404	24,582,496	396	534,487	8,228	4,076,293	25,891,210
Mississippi.....	820	7,696,179	413	361,854	7,995	2,321,077	12,136,488
Missouri.....	1,169	6,237,749	201	181,689	5,050	1,687,056	8,882,000
Montana.....	127	1,711,321	32	40,609	1,070	573,017	2,291,289
Nebraska.....	23	44,385	.....	.....	81	10,727	51,373
Nevada.....	4	5,162	.....	.....	4	1,375	7,060
New Hampshire.....	535	5,460,705	86	73,697	3,226	1,320,126	6,726,754
New Jersey.....	197	858,351	27	19,922	570	247,617	1,276,014
New Mexico.....	31	160,798	9	6,000	234	80,851	290,527
New York.....	1,742	10,736,550	297	242,503	5,578	2,225,383	11,676,620
North Carolina.....	1,751	6,255,000	364	257,478	9,910	2,084,650	11,782,101
North Dakota.....	4	7,950	1	300	11	2,676	21,800
Ohio.....	2,023	9,381,789	333	277,876	7,508	2,901,774	17,306,294
Oklahoma.....	33	46,955	1	600	43	9,475	63,569
Oregon.....	365	4,481,236	188	179,933	2,844	1,434,533	6,883,234
Pennsylvania.....	2,280	22,989,861	463	393,418	12,017	4,940,979	28,516,776
Rhode Island.....	33	103,339	3	725	115	40,607	185,313
South Carolina.....	716	2,933,475	199	123,642	3,945	776,377	4,253,670
South Dakota.....	28	138,115	13	11,161	122	61,979	292,938
Tennessee.....	1,694	8,956,798	375	323,270	10,007	3,067,312	15,229,933
Texas.....	601	8,381,728	318	316,204	5,867	2,296,614	10,533,438
Utah.....	81	99,148	7	1,850	135	41,825	189,562
Vermont.....	657	4,141,842	63	39,929	2,976	972,654	4,206,936
Virginia.....	1,324	5,208,551	311	209,527	6,581	1,852,614	9,900,057
Washington.....	535	12,592,523	500	485,935	9,710	5,085,156	18,617,179
West Virginia.....	929	5,293,975	240	194,639	4,823	1,657,437	9,390,818
Wisconsin.....	1,033	37,146,043	950	1,014,849	16,177	7,086,215	39,944,711
Wyoming.....	46	122,935	6	2,495	106	44,915	285,567
Total—U. S.	31,833	\$305,785,226	10,835	\$9,702,785	229,717	\$82,694,951	\$422,812,061

Average product per mill depends on value of timber sawed and on the size of the mills. In pine states, where extensive forests permit centralized operations, the average is high, as in Minnesota, with an average of \$64,087 to the mill. In sections where the timber is scat-

tering the mills are usually comparatively small, as in New York, with an average production of only \$6,728 per mill. In Minnesota the average stumpage value is high; in New York it is comparatively low.

In the two following tables, giving the figures for logging camps, those operated in connection with the sawmills and those operated independently are combined. The first relates to number of camps, capital and expense items, and the second to materials and products.

LOGGING CAMPS—SUMMARY BY STATES AND TERRITORIES, 1900.

STATES AND TERRITORIES.	Number of establishments.	Capital.	Proprietors.	Salaried employees.		Wage-earners.		Miscellaneous expenses.
				Number.	Salaries.	Number.	Wages.	
Alabama.....	653	\$ 6,588,875	797	111	\$ 62,457	3,703	\$ 892,822	\$ 628,928
Alaska.....	12	54,000	5	1	560	23	19,443	1,735
Arizona.....	7	489,026	8	6	8,360	145	107,040	30,150
Arkansas.....	738	9,572,851	872	121	84,016	5,779	1,809,366	1,166,337
California.....	231	18,295,293	278	75	86,805	4,063	2,078,567	514,533
Colorado.....	84	286,856	99	3	485	269	124,097	111,156
Connecticut.....	97	451,968	120	8	4,100	351	132,456	164,770
Delaware.....	31	81,135	38	1	700	98	22,060	11,104
Florida.....	252	8,143,661	301	67	46,273	2,676	814,673	641,730
Georgia.....	793	6,146,964	956	77	38,881	5,095	1,172,068	603,799
Idaho.....	66	284,532	79	3	550	191	84,096	44,800
Illinois.....	342	1,513,362	406	10	9,450	760	253,392	152,127
Indiana.....	591	1,883,526	707	26	16,125	2,430	898,496	419,455
Indian Territory.....	19	10,885	22	.....	.....	39	7,909	3,826
Iowa.....	85	3,096,092	102	2	2,000	126	52,536	374,675
Kansas.....	19	27,338	23	.....	.....	17	5,275	2,554
Kentucky.....	522	3,405,932	633	26	10,264	1,915	588,907	437,216
Louisiana.....	273	8,492,539	324	84	72,996	3,832	1,211,732	759,559
Maine.....	292	5,178,405	349	55	23,737	2,232	762,829	442,379
Maryland.....	164	1,101,641	197	14	5,750	621	147,213	161,129
Massachusetts.....	247	1,700,742	294	4	706	789	322,903	175,433
Michigan.....	690	31,588,689	824	349	301,894	13,107	5,845,880	1,782,481
Minnesota.....	165	25,042,470	189	223	170,135	8,839	3,902,231	1,954,632
Mississippi.....	500	8,825,755	600	77	49,342	4,261	1,223,297	646,606
Missouri.....	508	4,309,060	606	48	30,238	2,566	864,109	430,033
Montana.....	94	705,019	110	14	16,490	778	409,817	151,346
Nebraska.....	8	72,975	10	.....	.....	8	3,190	1,234
Nevada.....	4	4,165	5	.....	.....	2	850	618
New Hampshire.....	260	5,393,667	315	42	20,099	2,773	906,110	370,041
New Jersey.....	84	405,796	101	2	1,248	297	113,145	38,130
New Mexico.....	16	124,991	19	3	2,200	317	67,333	17,340
New York.....	647	9,499,802	774	57	33,673	2,684	1,036,357	610,010
North Carolina.....	918	6,242,710	1,100	70	37,315	4,812	1,059,329	733,696
North Dakota.....	4	19,160	5	.....	.....	5	1,400	1,175
Ohio.....	691	3,253,257	829	13	7,595	2,093	790,300	672,969
Oklahoma.....	7	89,206	8	.....	.....	6	1,250	665
Oregon.....	274	2,976,044	335	41	29,071	1,667	806,331	235,099
Pennsylvania.....	1,046	23,243,085	1,264	77	54,837	7,185	2,895,904	2,323,796
Rhode Island.....	19	111,560	22	1	600	66	23,537	25,945
South Carolina.....	370	1,900,440	444	36	16,800	2,103	437,433	212,072
South Dakota.....	25	130,436	30	2	1,800	144	69,346	25,124
Tennessee.....	653	2,890,722	788	38	17,965	1,369	571,657	535,533
Texas.....	413	9,594,329	492	52	37,245	3,421	1,261,805	631,110
Utah.....	43	72,205	58	.....	.....	62	22,822	10,069
Vermont.....	299	2,186,032	359	7	2,950	1,126	350,553	240,432
Virginia.....	661	3,449,113	792	75	50,965	3,580	1,039,708	560,330
Washington.....	551	11,854,999	697	202	218,131	8,206	4,716,129	1,113,646
West Virginia.....	407	4,757,919	487	45	29,464	2,784	898,387	387,554
Wisconsin.....	459	37,420,320	550	226	173,452	9,656	3,818,254	2,616,569
Wyoming.....	37	460,850	46	12	8,000	521	239,559	31,910
Total—United States.....	15,376	\$274,466,098	18,469	2,406	\$1,785,738	120,122	\$44,439,100	\$23,795,566

UNITED STATES—LUMBER PRODUCTION.

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LOGGING CAMPS—SUMMARY BY STATES AND TERRITORIES, 1900—Continued.

STATES AND TERRITORIES.	Materials.			Products. ²			
	Log stumpage.		Other stumpage ¹ and supplies.	Total value.	Sawlogs.		Other products.
	Quantity M feet b. m.	Cost.			Quantity M feet b. m.	Value.	
Alabama.....	818,585	\$ 978,816	\$ 334,108	\$3,603,065	808,354	\$ 3,474,565	\$ 128,500
Alaska.....	2,186	2,114	8,860	57,423	2,186	11,105	46,318
Arizona.....	35,975	37,150	1,915	299,813	35,975	269,813	30,000
Arkansas.....	1,460,354	1,580,902	361,915	7,032,361	1,434,868	6,804,366	227,995
California.....	902,876	1,043,244	313,613	4,653,717	843,646	3,905,502	748,215
Colorado.....	94,237	105,161	21,922	492,799	90,937	453,920	88,879
Connecticut.....	82,411	238,898	25,737	946,419	76,635	604,017	342,402
Delaware.....	13,260	46,775	2,502	85,218	13,260	73,593	11,625
Florida.....	597,929	732,039	213,773	3,719,799	554,707	3,453,154	266,645
Georgia.....	1,041,289	1,052,894	240,712	4,787,052	1,010,101	4,456,402	330,650
Idaho.....	55,005	59,997	43,157	309,862	54,793	216,457	93,405
Illinois.....	144,716	382,233	76,365	1,291,736	133,357	1,115,053	166,683
Indiana.....	420,628	2,207,006	191,971	4,068,050	407,514	3,825,913	232,137
Indian Territory.....	4,267	5,137	845	20,533	4,237	19,533	1,000
Iowa.....	107,735	532,871	39,223	1,333,165	107,735	1,310,058	23,107
Kansas.....	2,170	4,710	1,135	17,931	2,170	17,013	918
Kentucky.....	371,253	980,913	138,996	2,628,112	357,288	2,449,907	178,205
Louisiana.....	928,569	1,129,132	371,205	5,315,067	915,779	5,115,083	199,984
Maine.....	372,207	936,564	204,396	3,140,345	370,737	3,021,499	118,846
Maryland.....	117,596	343,902	43,485	867,214	117,376	792,113	75,101
Massachusetts.....	163,843	433,200	118,585	1,681,801	159,073	1,509,402	172,399
Michigan.....	2,307,813	7,067,793	1,548,209	20,462,235	2,216,224	16,850,747	3,611,488
Minnesota.....	1,394,157	6,585,304	846,104	16,031,839	1,920,002	15,525,752	506,087
Mississippi.....	891,903	1,162,130	307,080	4,137,652	867,513	3,994,865	142,787
Missouri.....	440,238	831,098	159,344	3,159,528	426,572	2,947,443	212,085
Montana.....	239,356	282,294	62,793	1,060,333	234,929	965,558	94,775
Nebraska.....	1,855	4,250	1,524	10,973	1,855	10,573	400
Nevada.....	725	755	205	2,914	725	2,914	.....
New Hampshire.....	520,814	1,394,884	131,150	3,930,448	510,065	3,552,268	378,180
New Jersey.....	39,239	154,222	43,862	427,999	38,159	288,565	139,434
New Mexico.....	25,088	28,617	8,057	204,794	21,088	101,644	103,150
New York.....	497,736	1,554,015	377,328	4,364,081	496,220	3,844,752	519,329
North Carolina.....	883,508	1,180,896	270,041	3,974,689	880,963	3,918,592	56,097
North Dakota.....	1,700	1,700	1,450	8,500	1,700	8,500	.....
Ohio.....	421,916	2,077,414	274,558	4,384,269	407,047	3,864,939	529,330
Oklahoma.....	805	2,045	385	4,685	805	4,685	.....
Oregon.....	483,723	320,038	106,750	2,079,618	443,175	1,977,169	102,444
Pennsylvania.....	1,759,507	5,173,444	976,720	14,316,677	1,747,476	11,732,110	2,584,567
Rhode Island.....	17,210	51,889	90	154,638	15,658	111,955	42,683
South Carolina.....	323,876	898,647	98,508	1,386,774	317,109	1,318,634	68,140
South Dakota.....	27,296	49,222	5,815	161,879	23,436	123,039	38,840
Tennessee.....	387,956	846,146	106,577	2,628,252	371,996	2,438,749	189,503
Texas.....	897,320	1,049,786	296,946	4,113,501	879,937	3,932,854	180,647
Utah.....	12,078	15,899	5,625	65,334	12,078	64,134	1,200
Vermont.....	212,675	443,901	58,047	1,272,491	213,275	1,236,075	36,416
Virginia.....	651,587	1,167,945	270,447	5,645,727	631,810	5,274,211	371,516
Washington.....	2,151,433	7,716,042	832,919	11,531,776	2,164,601	11,115,044	416,732
West Virginia.....	509,017	1,202,361	182,678	3,501,654	506,151	3,333,531	168,123
Wisconsin.....	2,462,901	8,653,582	984,734	18,112,112	2,412,833	17,364,091	748,021
Wyoming.....	88,417	112,287	52,764	599,516	15,552	88,491	511,025
Total—United States.....	25,928,940	\$56,439,474	\$10,767,020	\$174,066,365	25,279,702	\$153,880,352	\$15,186,013

¹ "Other stumpage" covers the class of timber from which such products as telegraph poles, fence posts, railway cross-ties, etc., were manufactured.

² The products of the camps not classified as sawlogs are shown in a separate table, which gives the details here combined under "Other products."

The total sawlog product of the timber camps, which should, when manufactured in the sawmills, produce the entire sawed lumber output of the country, is 25,279,702 feet, a quantity apparently too small as

compared with the total shown in a succeeding table; but is, undoubtedly, accounted for by the fact that log scales do not show the actual quantity of lumber that by modern machinery can be cut from the logs.

THE PLANING MILL INDUSTRY.

The planing mill industry, including sash, door and blind factories, but excluding planing mills operated as adjuncts to sawmills, is represented in the following table:

INDEPENDENT PLANING MILLS (NOT CONNECTED WITH SAWMILLS) AND SASH, DOOR AND BLIND FACTORIES—1900.

STATES AND TERRITORIES.	Number of establishments.	Total capital.	Proprietors and firm members.	Salaried officials, clerks, etc.		Wage-earners.		Total cost of materials used.	Products, including custom work and repairing.
				Number.	Salaries.	Average number.	Wages.		
Alabama.....	50	\$ 345,872	58	33	\$ 25,390	432	\$ 140,659	\$ 452,049	\$ 723,125
Arizona.....	3	35,544	4	1	600	13	10,000	36,132	71,682
Arkansas.....	50	1,213,011	57	89	66,969	1,082	345,806	1,459,636	2,256,522
California.....	136	3,431,949	149	162	176,290	2,022	1,211,188	2,436,391	4,807,660
Colorado.....	32	843,675	28	44	41,410	433	324,015	581,198	1,065,370
Connecticut.....	40	1,909,945	39	88	84,365	776	406,102	1,510,940	2,298,810
Delaware.....	12	215,495	17	8	5,790	91	37,736	104,535	178,185
Dist. of Col.....	10	252,397	11	20	16,095	235	109,558	204,979	428,744
Florida.....	20	415,349	20	23	25,595	481	186,675	405,492	777,782
Georgia.....	99	2,074,226	120	150	146,620	2,171	672,243	2,280,495	4,302,576
Idaho.....	7	37,640	7	1	360	11	6,750	20,201	36,620
Illinois.....	240	6,550,568	275	423	405,172	5,122	2,576,159	6,072,377	11,141,771
Indiana.....	205	3,394,054	257	189	160,210	2,115	879,544	2,957,266	5,038,669
Indian Ter.....	6	265,683	6	19	17,100	254	88,956	222,211	424,399
Iowa.....	65	3,576,306	66	187	180,435	2,372	983,924	3,195,343	5,236,546
Kansas.....	28	344,265	32	19	14,340	297	134,371	311,907	559,208
Kentucky.....	90	1,508,038	123	80	57,694	981	379,273	1,089,331	1,891,517
Louisiana.....	28	1,040,035	30	67	64,117	881	323,446	855,165	1,573,481
Maine.....	70	1,351,555	81	56	42,878	742	351,798	767,908	1,414,504
Maryland.....	62	3,259,501	81	93	75,261	1,287	529,362	2,310,655	3,558,083
Mass.....	143	4,120,037	156	230	228,867	2,434	1,344,066	3,635,754	6,292,281
Michigan.....	235	8,571,453	288	371	343,115	5,281	2,012,754	8,341,834	12,469,532
Minnesota.....	61	2,489,374	75	143	127,288	1,639	667,091	2,619,848	3,968,276
Mississippi.....	34	631,553	41	49	43,710	748	235,083	844,248	1,315,775
Missouri.....	88	3,540,243	69	221	219,472	1,999	1,016,039	2,247,720	4,417,871
Montana.....	8	275,781	7	14	10,970	49	43,810	129,010	198,169
Nebraska.....	21	378,966	19	32	27,525	294	129,441	561,731	886,330
New Hamp.....	57	1,142,201	70	49	32,686	871	373,556	924,587	1,590,510
N. Jersey.....	113	3,985,044	122	168	183,922	1,993	1,060,680	2,902,997	5,107,217
N. Mexico.....	6	35,674	6	.....	.....	29	16,185	27,087	57,100
New York.....	509	22,941,540	648	860	857,588	11,515	5,583,243	18,507,066	29,736,257
N. Carolina.....	101	1,366,823	100	126	83,990	1,989	473,589	1,501,478	2,992,056
Ohio.....	354	7,498,314	435	434	353,979	4,696	2,169,264	6,549,645	11,066,671
Oklahoma.....	3	15,300	5	.....	.....	10	4,490	3,365	14,600
Oregon.....	41	508,097	57	25	25,720	335	175,964	312,684	661,547
Penna.....	542	14,191,248	765	527	450,697	7,472	3,516,550	9,441,629	16,736,539
Rhode Island.....	19	611,300	25	22	23,240	282	136,102	325,615	694,018
S. Carolina.....	53	412,128	67	25	17,264	495	146,539	621,831	1,016,728
S. Dakota.....	7	34,552	6	1	800	15	6,282	27,407	48,664
Tennessee.....	88	1,343,381	108	71	61,319	1,170	452,079	1,330,800	2,323,247
Texas.....	76	932,860	93	62	51,968	657	332,288	900,302	1,605,297
Utah.....	28	199,543	32	16	9,300	114	63,617	116,276	252,187
Vermont.....	46	2,095,507	54	53	52,568	814	301,215	1,856,136	2,598,581
Virginia.....	88	1,618,158	108	96	74,946	1,333	467,902	1,825,501	2,686,826
Wash.....	29	762,120	22	57	59,860	647	329,206	685,263	1,257,269
W. Virginia.....	83	803,673	126	90	19,760	555	238,595	1,139,914	1,820,463
Wisconsin.....	123	6,591,114	123	245	277,107	4,377	1,633,319	5,036,773	8,400,635
All Other States.....	5	109,740	6	3	3,250	66	38,551	125,922	218,128
Total—U.S.....	4,204	\$119,271,631	5,094	5,682	\$6,249,632	73,627	\$32,685,210	\$99,927,707	\$163,343,001

THE PACKING BOX INDUSTRY.

While not a part of the lumber industry, the manufacture of wooden packing boxes is so closely associated with it as to justify its inclusion in this compilation. Not all the states are represented in it, and the magnitude of the business depends on both local demand and convenience of lumber supply. The following table contains the chief figures regarding it:

WOODEN PACKING BOXES—1900.

STATES AND TERRITORIES.	Number of establishments.	Total capital.	Wage-earners.		Miscellaneous expenses.	Total cost of materials used.	Products, including custom work and repairing.
			Average number.	Wages.			
California.....	23	\$ 717,116	599	\$ 284,068	\$ 65,421	\$ 1,027,905	\$ 1,778,970
Connecticut.....	12	75,439	86	41,715	9,029	104,588	186,191
Delaware.....	6	107,925	257	48,650	1,618	46,915	111,375
Florida.....	3	51,034	45	10,320	1,645	4,324	34,450
Georgia.....	7	187,170	274	56,164	9,643	76,249	194,881
Illinois.....	58	2,896,640	2,784	1,101,390	179,261	2,816,101	4,868,580
Indiana.....	18	308,554	419	140,973	25,902	337,940	597,121
Iowa.....	16	378,550	363	116,167	27,219	542,745	832,687
Kansas.....	9	223,655	284	88,850	12,315	338,938	485,322
Kentucky.....	9	482,784	630	186,973	9,581	379,074	692,894
Louisiana.....	6	92,706	107	34,280	15,202	121,084	230,300
Maine.....	28	444,449	404	156,966	31,908	348,021	599,858
Maryland.....	26	668,018	1,211	363,001	64,493	1,104,752	1,847,528
Massachusetts.....	94	2,413,227	2,081	914,332	185,774	2,052,668	3,723,518
Michigan.....	46	1,441,522	1,268	388,883	87,842	1,464,176	2,287,495
Minnesota.....	12	200,656	232	71,620	25,100	238,132	401,704
Mississippi.....	4	51,525	82	24,104	885	15,825	61,694
Missouri.....	27	668,275	850	32,611	61,641	814,797	1,467,054
Nebraska.....	3	20,275	43	17,930	1,157	53,888	78,640
New Hampshire.....	31	546,955	712	282,898	31,612	510,916	979,758
New Jersey.....	27	382,322	336	124,492	23,430	290,222	524,217
New York.....	159	4,497,105	3,363	1,449,646	373,483	4,954,761	7,850,262
North Carolina.....	11	44,235	183	23,821	2,459	30,956	76,093
Ohio.....	61	1,187,705	1,117	384,057	97,832	1,207,586	1,965,293
Oregon.....	6	184,377	190	47,000	20,632	98,420	172,070
Pennsylvania.....	59	1,211,183	865	352,535	51,197	1,344,918	2,117,029
Rhode Island.....	9	220,813	170	74,863	11,844	224,346	360,856
Tennessee.....	10	97,062	120	31,116	10,107	61,487	134,126
Texas.....	9	70,252	74	21,782	3,446	61,488	124,049
Vermont.....	34	207,719	201	70,020	6,894	138,084	264,286
Virginia.....	17	450,334	1,246	154,684	30,165	518,596	899,620
Washington.....	6	50,015	71	28,773	3,709	62,214	120,905
West Virginia.....	5	21,986	50	13,458	1,571	36,899	62,295
Wisconsin.....	38	1,325,604	1,290	386,743	68,620	1,250,395	1,989,663
All other States ¹	7	25,620	47	17,280	1,133	39,918	95,600
Total—U. S.....	896	\$21,952,757	22,034	\$7,827,955	\$1,553,710	\$22,807,627	\$38,216,384

¹ Includes establishments distributed as follows: Alabama, 1; Arkansas, 2; Colorado, 1; North Dakota, 1; South Carolina, 1; South Dakota, 1.

FOREST PRODUCTS IN 1899.

The census of 1900, in respect to annual output, related to the calendar year of 1899. The first table presented combines all products which are given in thousands of feet board measure, including not only lumber and sawed timber, but such other items as pickets, palings, etc. It would seem that the totals should be much larger than those furnished by sawed lumber alone, but such is not the case. While the "side

lines" of the lumber trade are important they are almost insignificant in comparison to the enormous values represented by sawed lumber and timber. In fact, many of them are merely by-products.

PRODUCTS—BY STATES AND TERRITORIES, 1900.

Sawed lumber (includes all products given in M feet board measure).

STATES AND TERRITORIES.	Total.		Merchant. ¹		Custom. ²	
	Quantity, M feet board measure.	Value.	Quantity, M feet board measure.	Value.	Quantity (estimated), M feet board measure.	Value (estimated).
Alabama.....	1,101,386	\$ 9,823,239	1,036,841	\$ 9,262,377	64,545	\$ 570,862
Alaska.....	6,571	69,249	6,571	69,249		
Arizona.....	36,182	407,308	36,122	406,588	60	720
Arkansas.....	1,623,987	14,160,571	1,601,510	13,951,546	22,477	209,025
California.....	737,085	7,823,897	729,850	7,754,872	7,185	69,025
Colorado.....	133,746	1,269,306	132,746	1,258,522	1,000	10,784
Connecticut.....	108,093	1,614,701	78,983	1,152,140	29,110	462,561
Delaware.....	35,955	395,828	27,536	316,707	8,399	79,121
Florida.....	790,373	7,853,462	782,677	7,786,452	7,696	67,010
Georgia.....	1,311,917	11,355,532	1,257,468	10,932,272	54,449	423,260
Idaho.....	65,363	614,188	62,238	581,934	3,125	32,254
Illinois.....	388,469	5,049,663	336,891	4,434,282	51,578	615,381
Indiana.....	1,036,999	16,815,041	853,479	14,154,157	183,520	2,660,884
Indian Territory.....	15,985	167,480	14,559	149,328	1,426	13,152
Iowa.....	352,411	5,146,785	328,166	4,789,059	24,243	357,726
Kansas.....	10,665	146,180	5,826	74,540	4,839	71,640
Kentucky.....	774,651	10,045,547	682,691	8,994,720	91,960	1,050,827
Louisiana.....	1,115,366	10,916,954	1,107,876	10,859,901	7,490	57,056
Maine.....	784,647	9,256,158	701,787	8,347,909	82,860	908,249
Maryland.....	183,711	2,036,716	159,523	1,774,001	24,188	262,715
Massachusetts.....	344,190	4,005,845	273,858	3,180,402	70,332	825,443
Michigan.....	3,018,338	35,865,616	2,648,247	31,612,301	370,091	4,253,315
Minnesota.....	2,342,338	28,637,800	1,858,612	22,731,828	483,726	5,906,972
Mississippi.....	1,206,265	11,665,152	1,173,109	11,352,144	33,156	313,008
Missouri.....	723,754	8,011,622	643,187	7,113,585	80,567	897,037
Montana.....	256,685	2,297,860	247,666	2,221,496	8,019	76,364
Nebraska.....	4,656	54,831	4,220	49,511	435	5,320
Nevada.....	725	7,060	725	7,060		
New Hampshire.....	572,447	6,544,136	495,758	5,780,163	76,689	813,973
New Jersey.....	74,118	1,233,323	57,549	945,539	16,569	287,790
New Mexico.....	30,880	289,401	27,802	260,915	3,078	28,486
New York.....	878,448	12,364,362	685,173	8,907,359	193,275	2,457,003
North Carolina.....	1,286,638	11,067,909	1,195,028	10,371,778	91,610	696,131
North Dakota.....	2,030	22,060	2,000	21,700	30	360
Ohio.....	990,497	15,820,939	768,908	12,756,868	221,589	3,064,071
Oklahoma.....	6,119	69,374	4,626	58,688	1,493	15,686
Oregon.....	734,538	6,691,214	732,906	6,675,623	1,632	15,591
Pennsylvania.....	2,333,278	27,476,411	2,125,518	24,946,309	207,760	2,530,102
Rhode Island.....	18,528	226,919	18,737	165,951	4,791	61,968
South Carolina.....	466,429	3,933,009	446,416	3,781,460	20,013	151,549
South Dakota.....	31,704	299,188	29,133	275,278	2,571	23,910
Tennessee.....	950,958	11,832,596	825,196	10,372,628	125,762	1,460,968
Texas.....	1,232,404	10,197,575	1,214,013	10,041,932	18,391	155,643
Utah.....	17,548	209,308	14,185	170,883	3,363	38,425
Vermont.....	875,809	4,294,276	807,870	3,508,219	68,439	786,057
Virginia.....	959,119	9,379,689	883,571	8,642,277	75,548	737,412
Washington.....	1,429,032	12,291,046	1,411,080	12,142,006	17,952	149,140
West Virginia.....	778,051	9,155,416	682,921	8,141,940	95,130	1,013,476
Wisconsin.....	3,389,196	41,362,531	2,776,662	33,956,453	612,534	7,406,078
Wyoming.....	16,963	213,200	15,488	194,580	1,475	18,620
Total—U. S.....	35,084,166	\$390,489,873	31,508,214	\$347,402,903	3,575,952	\$43,086,970

¹ Includes 292,586 M feet board measure, valued at \$5,099,951, made up of all items reported in M feet board measure under "Other sawed products."

² Includes 4,546 M feet board measure, valued at \$61,618, made up of all items of custom product reported in M feet board measure under "Other sawed products."

ROUGH LUMBER PRODUCTS.

The next succeeding table gives the aggregates of the rough lumber products of the United States, by states, in 1899, by quantity and value. It is followed by tables, showing, first, the product of the conifers, by specified woods, and, second, the product of hardwoods, and then the shingle product.

ROUGH LUMBER PRODUCTS—BY STATES AND TERRITORIES, 1900.

STATES AND TERRITORIES.	Aggregate.		Total, conifers.		Total, hardwoods.	
	Quantity, M feet board measure.	Value.	Quantity, M feet board measure.	Value.	Quantity, M feet board measure.	Value.
Alabama.....	1,096,539	\$ 9,771,908	991,048	\$ 8,431,801	105,491	\$ 1,340,107
Alaska.....	6,571	89,249	6,571	89,249	.....	.....
Arizona.....	36,182	407,308	36,182	407,308	.....	.....
Arkansas.....	1,595,933	13,665,163	1,151,931	8,823,530	444,102	4,841,633
California.....	734,232	7,795,277	733,693	7,786,690	539	8,587
Colorado.....	133,746	1,269,306	133,671	1,268,408	75	900
Connecticut.....	107,594	1,598,515	30,000	387,393	77,594	1,211,122
Delaware.....	35,395	385,693	29,076	270,446	6,319	115,247
Florida.....	788,905	7,839,134	786,705	7,802,214	2,200	36,920
Georgia.....	1,308,610	11,324,211	1,265,811	10,874,190	42,799	450,021
Idaho.....	65,331	613,728	65,331	613,728	.....	.....
Illinois.....	381,584	4,916,919	131,223	1,866,413	250,361	3,050,506
Indiana.....	977,878	15,642,971	2,099	29,678	975,779	15,613,293
Indian Territory.....	19,980	167,355	6,602	62,145	9,378	105,210
Iowa.....	351,769	5,135,892	290,741	4,165,316	61,028	970,576
Kansas.....	10,645	145,795	.....	.....	10,645	145,795
Kentucky.....	765,343	9,851,555	30,957	315,725	734,386	9,535,830
Louisiana.....	1,113,423	10,888,747	1,041,225	9,705,329	72,198	1,183,418
Maine.....	756,515	8,926,737	727,785	8,572,632	28,730	354,105
Maryland.....	183,393	2,030,740	105,812	972,107	77,581	1,058,633
Massachusetts.....	342,058	3,968,325	299,911	3,204,906	42,147	763,419
Michigan.....	3,012,057	35,784,606	2,200,408	26,168,885	811,649	9,615,721
Minnesota.....	2,341,619	28,626,935	2,279,663	27,863,684	61,956	763,251
Mississippi.....	1,202,334	11,614,390	995,012	8,974,808	207,322	2,639,582
Missouri.....	715,968	7,859,509	273,732	2,584,875	442,236	5,274,634
Montana.....	255,685	2,297,860	254,385	2,276,360	1,300	21,500
Nebraska.....	4,655	54,831	872	11,130	3,783	43,701
Nevada.....	725	7,060	725	7,060	.....	.....
New Hampshire.....	562,258	6,361,929	538,790	5,994,371	23,468	387,558
New Jersey.....	72,660	1,195,409	40,759	592,312	31,871	603,097
New Mexico.....	30,880	289,401	30,880	289,401	.....	.....
New York.....	874,754	12,286,346	667,528	7,969,031	207,226	4,316,415
North Carolina.....	1,278,399	10,951,145	1,132,742	9,430,631	145,657	1,520,514
North Dakota.....	2,030	22,060	.....	.....	2,030	22,060
Ohio.....	957,239	14,996,419	39,008	700,299	918,231	14,296,120
Oklahoma.....	6,075	68,664	10	6,065	.....	.....
Oregon.....	734,181	6,686,601	731,652	6,647,223	2,529	39,378
Pennsylvania.....	2,321,284	27,303,868	1,901,122	19,905,286	520,162	7,398,582
Rhode Island.....	18,265	220,719	14,277	155,724	3,988	64,995
South Carolina.....	466,109	3,929,629	445,626	3,732,688	17,483	196,941
South Dakota.....	31,704	299,188	31,146	293,208	558	6,980
Tennessee.....	939,463	11,595,991	77,589	721,716	861,874	10,874,275
Texas.....	1,230,904	10,177,609	1,192,848	9,735,873	38,066	441,736
Utah.....	17,484	208,603	17,484	208,603	.....	.....
Vermont.....	365,869	4,124,486	315,446	3,467,344	50,423	657,142
Virginia.....	956,169	9,545,422	716,309	6,602,485	239,860	2,742,934
Washington.....	1,428,205	12,284,737	1,422,502	12,192,001	5,703	62,136
West Virginia.....	775,683	9,103,331	205,375	1,895,928	570,208	7,207,623
Wisconsin.....	3,361,943	40,833,690	2,842,912	34,196,109	519,031	6,737,581
Wyoming.....	16,957	213,118	16,957	213,118	.....	.....
Total—U. S.....	34,787,084	\$385,298,304	26,153,063	\$268,481,112	8,634,021	\$116,817,192

ROUGH LUMBER PRODUCTS, BY STATES AND TERRITORIES, 1900. CONIFERS.

STATES AND TERRITORIES.	Total.		Yellow pine.		White pine.		Hemlock.		Redwood.		Spruce.	
	Quantity M feet.	Value.	Quantity M feet.	Value.	Quantity M feet.	Value.	Quantity M feet.	Value.	Quantity M feet.	Value.	Quantity M feet.	Value.
Alabama.....	991,048	\$ 8,418,901	990,089	\$ 8,418,019	.....	.....	.....	.....	.....	.....	6,056	\$ 52,599
Alaska.....	6,571	89,249	.....	.....	.....	.....	.....	.....	.....	.....	104	2,940
Arizona.....	36,182	407,308	36,078	404,368	.....	.....	.....	.....	.....	.....	.....	.....
Arkansas.....	1,151,831	8,823,530	1,106,252	8,345,819	.....	.....	.....	.....	.....	.....	19,557	208,216
California.....	738,698	7,796,690	285,306	8,100,844	.....	.....	.....	.....	.....	.....	87,317	387,525
Colorado.....	133,671	1,288,406	96,354	880,941	.....	.....	.....	.....	.....	.....	100	1,200
Connecticut.....	30,000	887,833	2,575	61,125	23,797	\$ 281,546	.....	.....	.....	.....	.....	.....
Delaware.....	29,076	270,446	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Florida.....	786,708	7,802,214	701,877	6,588,125	.....	.....	.....	.....	.....	.....	.....	.....
Georgia.....	1,265,311	10,574,190	1,251,266	10,500,576	.....	.....	.....	.....	.....	.....	.....	.....
Idaho.....	65,331	613,728	62,769	501,831	1,990	18,200	.....	.....	.....	.....	.....	.....
Illinois.....	131,223	1,866,413	.....	.....	129,756	1,851,353	.....	.....	.....	.....	.....	.....
Indiana.....	2,099	29,678	892	6,675	890	11,812	.....	.....	.....	.....	.....	.....
Iowa.....	6,802	62,145	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kentucky.....	290,741	4,165,316	.....	.....	298,591	4,147,505	.....	.....	.....	.....	.....	.....
Louisiana.....	30,357	815,725	20,781	209,453	.....	.....	.....	.....	.....	.....	.....	.....
Maine.....	1,041,226	9,705,829	792,698	6,389,054	.....	.....	.....	.....	.....	.....	.....	.....
Maryland.....	777,785	8,572,632	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mass.....	105,812	972,107	79,365	743,600	.....	.....	.....	.....	.....	.....	.....	.....
Michigan.....	299,911	3,204,906	.....	.....	214,196	2,515,222	.....	.....	.....	.....	.....	.....
Minnesota.....	2,200,406	20,868,885	.....	.....	1,811	21,820	.....	.....	.....	.....	.....	.....
Mississippi.....	2,279,658	27,168,885	.....	.....	298,214	2,695,876	.....	.....	.....	.....	.....	.....
Missouri.....	985,012	8,974,808	900,877	8,035,557	.....	.....	.....	.....	.....	.....	.....	.....
Montana.....	273,752	2,594,875	158,051	1,423,954	109,599	1,099,837	.....	.....	.....	.....	.....	.....
Nebraska.....	254,285	2,276,360	153,467	1,376,000	.....	.....	.....	.....	.....	.....	.....	.....
Nevada.....	872	11,130	872	11,130	.....	.....	.....	.....	.....	.....	.....	.....
New Hampshire.....	725	7,050	875	4,610	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey.....	538,799	5,994,371	.....	.....	307,131	8,270,368	.....	.....	.....	.....	.....	.....
New Mexico.....	40,789	592,312	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York.....	30,580	299,401	30,677	285,696	.....	.....	.....	.....	.....	.....	.....	.....
N. Carolina.....	667,528	7,969,851	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N. Carolina.....	1,132,742	9,430,631	1,109,172	9,182,590	.....	.....	.....	.....	.....	.....	.....	.....
Ohio.....	89,009	700,239	.....	.....	24,897	455,564	.....	.....	.....	.....	.....	.....
Oklahoma.....	10	250	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oregon.....	781,652	6,647,228	158,428	1,176,977	.....	.....	.....	.....	.....	.....	.....	.....
Penn.....	1,801,122	19,905,286	17,901	217,976	.....	.....	.....	.....	.....	.....	.....	.....
Rhode Isl.....	14,277	165,724	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
S. Carolina.....	443,626	8,752,688	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
S. Dakota.....	81,146	238,208	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee.....	77,589	721,716	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Texas.....	1,192,546	9,736,878	1,188,069	9,664,400	.....	.....	.....	.....	.....	.....	.....	.....
Utah.....	17,464	208,608	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vermont.....	814,446	8,467,844	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Virginia.....	715,309	6,602,458	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington.....	1,622,502	12,192,601	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin.....	208,576	1,886,628	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wyoming.....	2,842,912	84,196,100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wyoming.....	16,987	218,118	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total—U. S.....	26,158,098	\$268,451,112	10,809,106	\$90,908,556	7,468,289	\$94,979,895	8,430,678	\$84,156,892	800,157	\$8,645,008	1,446,001	\$19,332,999

No product reported for Kansas and North Dakota.

UNITED STATES—LUMBER PRODUCTION.

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ROUGH LUMBER PRODUCTS, BY STATES AND TERRITORIES, 1900, CONIFERS—Continued.

States and Territories.	Cypress.		Cedar.		Norway pine.		Red fir.		Sugar pine.		Tamarack.		All other conifers.	
	Quantity, M feet.	Value.	Quantity, M feet.	Value.	Quantity, M feet.	Value.	Quantity, M feet.	Value.	Quantity, M feet.	Value.	Quantity, M feet.	Value.	Quantity, M feet.	Value.
Alabama.....	851	\$ 12,222	158	\$ 1,560	.....	.....	.....	.....	.....	.....	.....	.....	500	\$ 5,500
Alaska.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	80	600
Arizona.....	45,569	477,811	20	400	.....	.....	.....	.....	.....	.....	.....	.....	413	10,585
Arkansas.....	.....	.....	1,211	13,980	.....	.....	15,621	\$ 156,546	.....	.....	.....	.....	.....	.....
California.....	100	8,000	120	3,600	.....	.....	.....	.....	62,108	\$646,810	.....	.....	.....	.....
Connecticut.....	85,028	1,219,089	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Florida.....	14,946	278,614	.....	.....	.....	.....	4,968	49,682	.....	.....	.....	.....	.....	.....
Georgia.....	.....	.....	2,100	16,000	.....	.....	.....	.....	.....	.....	.....	.....	136	1,875
Idaho.....	1,436	15,083	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Illinois.....	813	6,186	15	243	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Indiana.....	1,077	13,099	682	14,628	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kentucky.....	248,332	3,316,275	7,354	87,315	2,400	\$ 22,800	.....	.....	.....	.....	.....	.....	.....	.....
Louisiana.....	.....	.....	20	500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maine.....	130	2,110	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland.....	.....	.....	176	1,975	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts.....	.....	.....	68,451	615,742	50,719	659,608	.....	.....	.....	.....	.....	.....	.....	.....
Michigan.....	.....	.....	11,876	127,000	108,911	1,104,050	.....	.....	.....	.....	.....	.....	.....	.....
Minnesota.....	34,135	489,251	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mississippi.....	9,062	91,514	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Missouri.....	.....	.....	.....	.....	.....	.....	61,931	566,352	.....	.....	.....	.....	.....	.....
Montana.....	1,000	30,000	.....	.....	80	920	.....	.....	.....	.....	.....	.....	.....	.....
New Hampshire.....	.....	.....	10,378	156,069	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey.....	.....	.....	1,538	77,940	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York.....	19,650	198,737	2,470	29,832	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Carolina.....	.....	.....	156	1,900	6,200	130,000	.....	.....	.....	.....	.....	.....	.....	.....
Ohio.....	.....	.....	10	250	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oklahoma.....	.....	.....	31,313	340,492	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oregon.....	.....	.....	.....	.....	.....	.....	601,237	4,514,312	1,450	12,206	.....	.....	.....	.....
Pennsylvania.....	25,666	333,922	320	3,230	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Carolina.....	1,791	20,210	2,821	53,168	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee.....	4,699	71,078	80	400	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Texas.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Utah.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vermont.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Virginia.....	3,240	62,808	506	10,068	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington.....	.....	.....	83,670	889,969	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Virginia.....	.....	.....	100	1,000	.....	.....	1,182,672	9,785,237	.....	.....	.....	.....	.....	.....
Wisconsin.....	.....	.....	9,997	115,049	93,798	1,105,297	.....	.....	.....	.....	.....	.....	.....	.....
Wyoming.....	.....	.....	.....	.....	.....	.....	80	1,100	.....	.....	.....	.....	.....	.....
Total—U. S.....	446,386	\$5,604,495	282,978	\$2,542,519	299,108	\$3,022,670	1,798,507	\$15,060,688	83,568	\$669,018	50,619	\$442,018	9,135	\$170,852

No product reported for Colorado, Delaware, Indian Territory, Iowa, Kansas, Nebraska, Nevada, New Mexico, North Dakota, Rhode Island and South Dakota.

ROUGH LUMBER PRODUCTS, BY STATES AND TERRITORIES, 1900. CONIFERS.

States and Territories.	Total.		Yellow pine.		White pine.		Hemlock.		Redwood.		Spruce.	
	Quantity M feet.	Value.	Quantity M feet.	Value.	Quantity M feet.	Value.	Quantity M feet.	Value.	Quantity M feet.	Value.	Quantity M feet.	Value.
Alabama.....	991,046	\$ 8,431,801	990,089	\$ 8,419,019	.....	.....	15	\$ 180	.....	.....	6,056	\$ 52,569
Alaska.....	80,240	80,240	80,028	80,028	.....	.....	.....	.....	.....	.....	104	2,340
Arizona.....	86,192	407,389	86,028	404,368	.....	.....	.....	.....	.....	.....	18,557	208,718
Arkansas.....	1,151,931	8,822,589	1,146,242	8,805,242	.....	.....	810	8,100	380,167	88,645,606	87,817	267,235
California.....	728,668	7,786,690	728,584	7,785,844	.....	.....	.....	.....	.....	.....	100	1,200
Colorado.....	183,671	1,587,893	183,584	1,586,844	.....	.....	.....	.....	.....	.....	.....	.....
Connecticut.....	80,068	270,446	80,068	270,446	23,737	\$ 241,548	.....	46,920	.....	.....	.....	.....
Delaware.....	78,076	270,446	78,076	270,446	.....	.....	.....	.....	.....	.....	.....	.....
District of Columbia.....	7,802,214	7,802,214	7,802,214	7,802,214	.....	.....	.....	.....	.....	.....	.....	.....
Florida.....	758,708	10,874,190	758,708	10,874,190	.....	.....	.....	.....	.....	.....	.....	.....
Georgia.....	1,265,811	10,874,190	1,265,811	10,874,190	.....	.....	.....	.....	.....	.....	.....	.....
Idaho.....	66,331	618,728	66,331	618,728	.....	.....	.....	.....	.....	.....	.....	.....
Illinois.....	181,228	1,587,893	181,228	1,587,893	.....	.....	.....	.....	.....	.....	.....	.....
Indiana.....	2,009	6,002	2,009	6,002	.....	.....	.....	.....	.....	.....	.....	.....
Iowa.....	80,971	80,971	80,971	80,971	.....	.....	.....	.....	.....	.....	.....	.....
Kentucky.....	1,041,226	9,705,829	1,041,226	9,705,829	.....	.....	.....	.....	.....	.....	.....	.....
Louisiana.....	727,786	8,072,632	727,786	8,072,632	.....	.....	.....	.....	.....	.....	.....	.....
Maine.....	105,812	972,107	105,812	972,107	.....	.....	.....	.....	.....	.....	.....	.....
Maryland.....	200,911	2,204,806	200,911	2,204,806	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts.....	2,200,468	2,200,468	2,200,468	2,200,468	.....	.....	.....	.....	.....	.....	.....	.....
Michigan.....	2,279,059	2,279,059	2,279,059	2,279,059	.....	.....	.....	.....	.....	.....	.....	.....
Minnesota.....	278,722	2,576,890	278,722	2,576,890	.....	.....	.....	.....	.....	.....	.....	.....
Mississippi.....	2,279,059	2,279,059	2,279,059	2,279,059
Missouri.....	284,865	2,576,890	284,865	2,576,890
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ROUGH LUMBER PRODUCTS, BY STATES AND TERRITORIES, 1900—HARDWOODS.

STATES AND TERRITORIES.	Total.		Ash.		Birch.		Chestnut.		Cottonwood.	
	Quantity. M feet.	Value.	Quantity. M feet.	Value.	Quantity. M feet.	Value.	Quantity. M feet.	Value.	Quantity. M feet.	Value.
Alabama.....	105,491	\$ 1,340,107	5,782	\$ 93,645	1	\$ 15	65	\$ 683	6,042	\$ 75,005
Arkansas.....	444,102	4,841,633	15,624	230,370					116,825	1,141,244
California.....	539	8,587								
Colorado.....	75	900								
Connecticut.....	77,594	1,211,122	158	4,470	460	6,780	64,506	964,337	25	1,000
Delaware.....	6,319	115,247								
Florida.....	2,200	36,920	462	7,820						
Georgia.....	42,789	450,021	992	17,911					18,937	219,654
Illinois.....	250,361	3,050,508	1,075	14,236	110	1,110	107	1,370	1,793	24,217
Indiana.....	975,779	15,613,293	27,603	519,435	50	625			3,278	33,010
Indian Territory	9,378	106,210							3,663	48,495
Iowa.....	61,028	970,576	347	8,010	56	745			3,188	40,208
Kansas.....	10,645	145,795	25	290					225	2,000
Kentucky.....	734,386	9,535,830	4,877	67,496	31	312	7,885	83,141	53,097	624,280
Louisiana.....	72,198	1,183,418	4,979	106,825						
Maine.....	28,730	354,105	1,269	16,019	14,061	164,748				
Maryland.....	77,691	1,058,633	3	60	305	3,100				
Massachusetts.....	42,147	763,419	120	2,145						
Michigan.....	811,649	9,615,721	85,753	1,206,412	1,000	13,305	4,967	57,682		
Minnesota.....	61,956	763,251	3,690	44,928	12,428	154,465	19,488	251,843	704	8,449
Mississippi.....	207,322	2,639,582	10,144	156,035	1,000	12,000	123	2,460	772	10,235
Missouri.....	442,236	5,274,634	10,458	240,851					39,714	407,560
Montana.....	1,300	21,500			268	2,628			75,750	659,360
Nebraska.....	3,783	43,701								
New Hampshire.....	23,468	387,558	1	40					3,190	36,595
New Jersey.....	31,871	603,097	1,248	20,316	2,639	33,564				
New York.....	207,226	4,316,415	11	340			3,430	52,080		
North Carolina.....	145,657	1,520,514	8,956	151,429	12,909	185,091	10,418	163,895	260	2,800
North Dakota.....	2,030	22,060	3,617	46,217	20	240	13,942	37,943		
Ohio.....	918,231	14,296,120					2,660			
Oklahoma.....	6,065	68,414	28,934	506,675			4,403	59,476	2,080	22,060
Oregon.....	2,629	39,378	100	1,000					4,077	50,964
Pennsylvania.....	520,162	7,398,582	610	10,650					2,494	27,468
Rhode Island.....	3,968	64,995	4,677	80,021	10,266	138,186			87	700
South Carolina.....	17,453	196,941	34	729	30	350	4,614	569,764	40	600
South Dakota.....	558	5,980	1,371	23,910			2,815	41,430		
Tennessee.....	861,874	10,874,276								
Texas.....	38,056	441,736	18,100	292,568	50	750	10,849	137,570	3,060	35,800
Vermont.....	50,423	607,142	6,793	83,938					558	5,980
Virginia.....	239,860	2,742,934	1,200	19,307	16,251	197,944	347	4,840	74,233	817,008
Washington.....	5,703	92,136	1,060	16,233			3,487	36,007	798	9,364
West Virginia.....	570,208	7,207,623	3,203	53,036						
Wisconsin.....	519,031	6,757,581	2,207	35,494			13,546	131,653	300	3,100
			13,647	185,738	60,318	786,383				
Total—U. S. . .	8,934,021	\$116,817,192	269,120	\$4,263,599	132,601	\$1,037,921	306,688	\$3,764,069	416,124	\$4,308,644

ROUGH LUMBER PRODUCTS, BY STATES AND TERRITORIES, 1900—HARDWOODS—Continued.

STATES AND TERRITORIES.	Elm.		Gum.		Hickory.		Basswood.		Oak.	
	Quantity, M feet.	Value.	Quantity, M feet.	Value.	Quantity, M feet.	Value.	Quantity, M feet.	Value.	Quantity, M feet.	Value.
Alabama.....	588	\$ 9,768	10,807	\$ 131,815	824	\$ 12,119	.....	.....	63,925	\$ 814,844
Arizona.....	3,228	33,204	60,856	539,540	8,321	67,888	.....	.....	234,938	2,787,488
California.....	.....	.....	100	2,000	.....	.....	.....	.....	378	4,387
Colorado.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Connecticut.....	3	75	.....	.....	.....	.....	.....	.....	.....	.....
Delaware.....	.....	.....	328	3,945	.....	7,848	.....	.....	.....	.....
Florida.....	.....	.....	139	2,312	.....	7,406	.....	.....	10,814	10,071
Georgia.....	.....	.....	1,852	20,464	.....	1,685	.....	.....	1,854	10,772
Illinois.....	16,867	180,150	17,839	187,035	163	1,635	.....	.....	28,542	307,873
Indiana.....	74,669	822,644	30,675	284,460	9,424	232,329	.....	.....	171,839	2,017,845
Indian Territory.....	.....	.....	.....	.....	32,520	616,196	.....	.....	649,784	10,309,704
Iowa.....	13,878	174,394	.....	.....	.....	.....	.....	.....	5,587	53,390
Kansas.....	2,319	32,115	.....	.....	188	4,565	.....	.....	33,722	513,393
Kentucky.....	3,213	41,021	28,589	287,839	82	1,065	.....	.....	4,214	4,021,819
Louisiana.....	83	830	2,597	25,549	5,063	79,501	.....	.....	399,700	4,092,832
Maine.....	68	683	.....	.....	267	6,852	.....	.....	7,781	107,363
Maryland.....	.....	.....	1,055	13,270	100	1,800	.....	.....	5,608	107,143
Massachusetts.....	.....	.....	.....	.....	51	906	.....	.....	65,842	824,104
Michigan.....	109,443	1,187,439	80	890	.....	7,866	.....	.....	18,091	1,861,869
Minnesota.....	8,354	76,551	.....	.....	466	.....	.....	.....	135,830	1,861,869
Mississippi.....	.....	.....	23,270	238,180	1,313	19,120	.....	.....	37,638	498,894
Missouri.....	28,124	280,189	51,498	478,749	5,289	84,471	.....	.....	104,506	1,600,249
Montana.....	.....	.....	.....	.....	.....	.....	.....	.....	252,439	3,983,918
Nebraska.....	440	4,580	.....	.....	.....	.....	.....	.....	1,300	21,800
New Hampshire.....	.....	.....	.....	.....	.....	.....	.....	.....	143	1,886
New Jersey.....	22	250	156	2,383	.....	.....	.....	.....	12,608	324,885
New York.....	16,157	313,084	.....	.....	869	20,660	.....	.....	19,178	395,884
North Carolina.....	.....	.....	551	5,180	1,073	21,075	.....	.....	44,750	874,365
North Dakota.....	.....	.....	.....	.....	434	4,765	.....	.....	86,351	883,366
Ohio.....	98,413	1,146,724	100	952	.....	.....	.....	.....	596,618	9,314,424
Oklahoma.....	230	2,630	.....	.....	20,282	367,460	.....	.....	3,182	38,363
Oregon.....	.....	.....	.....	.....	.....	.....	.....	.....	867	15,905
Pennsylvania.....	2,619	32,265	60	455	.....	.....	.....	.....	1,077	21,716
Rhode Island.....	.....	.....	.....	.....	4,273	79,317	.....	.....	11,344	120,871
South Carolina.....	.....	.....	1	10	.....	80	.....	.....	.....	.....
South Dakota.....	.....	.....	.....	.....	.....	.....	.....	.....	412,116	5,300,069
Tennessee.....	3,498	30,751	52,357	515,286	7,848	142,089	.....	.....	27,312	311,143
Texas.....	2,018	24,146	565	5,925	489	5,460	.....	.....	7,489	100,108
Vermont.....	628	7,114	.....	.....	25	500	.....	.....	144,904	1,690,005
Virginia.....	2	20	2,110	19,341	568	7,120	.....	.....	354,900	3,000
Washington.....	.....	.....	.....	.....	.....	.....	.....	.....	854,443	4,133,365
West Virginia.....	.....	.....	25	100	1,070	13,418	.....	.....	136,902	1,967,920
Wisconsin.....	76,897	908,746	100	1,000	1,272	22,653	.....	.....	.....	.....
Total—U. S.....	456,731	\$5,240,530	285,417	\$2,747,680	96,636	\$1,814,500	308,069	\$2,954,625	4,438,027	\$61,174,129

No product reported for Alaska, Arizona, Idaho, Nevada, New Mexico, Utah and Wyoming.

ROUGH LUMBER PRODUCTS, BY STATES AND TERRITORIES, 1900—HARDWOODS—Continued.

STATES AND TERRITORIES.	Poplar.		Black walnut.		Maple.		Sycamore.		Other hardwoods.	
	Quantity, M feet.	Value.	Quantity, M feet.	Value.	Quantity, M feet.	Value.	Quantity, M feet.	Value.	Quantity, M feet.	Value.
Alabama.....	17,484	\$ 197,144	193	\$ 5,271	66	\$ 1,060	455	\$ 4,316	31	\$ 430
Arkansas.....	8,713	90,362	175	3,641	.....	.....	.....	.....	.....	.....
California.....	.....	.....	60	2,200	.....	.....	.....	.....	.....	.....
Colorado.....	75	900	.....	.....	413	8,326	.....	.....	725	13,350
Connecticut.....	90	1,215	62	1,600	.....	.....	.....	.....	.....	.....
Delaware.....	35	1,000	21	1,260	.....	.....	.....	.....	.....	.....
Florida.....	60	1,560	.....	.....	.....	.....	.....	.....	.....	.....
Georgia.....	10,447	113,751	100	1,200	55	688	.....	.....	108	1,132
Illinois.....	5,164	69,275	958	32,022	3,076	34,213	4,412	44,947	518	24,456
Indiana.....	56,633	916,663	10,637	416,770	21,062	268,057	8,733	105,220	54,191	609,913
Italian Territory.....	.....	.....	4,315	8,500	.....	.....	.....	.....	.....	.....
Iowa.....	55	610	4,313	154,745	428	6,972	5	75	76	2,140
Kansas.....	.....	.....	426	7,323	53	750	125	1,690	15	325
Kentucky.....	272,641	3,892,344	2,113	63,902	2,060	27,021	1,860	21,060	5,088	49,138
Louisiana.....	2,342	37,760	60	4,800	.....	.....	.....	.....	3,002	300,140
Maine.....	4,845	5,875	.....	.....	3,427	89,314	.....	.....	728	8,524
Maryland.....	.....	.....	23	636	.....	.....	.....	.....	240	3,200
Massachusetts.....	295	5,190	45	1,875	2,897	82,780	.....	.....	2,481	108,398
Michigan.....	518	9,254	451	21,340	398,165	4,319,338	504	5,710	21,888	231,998
Minnesota.....	373	4,249	5	100	2,189	32,060	.....	.....	44	508
Mississippi.....	28,310	397,788	.....	.....	.....	.....	10	100	55	550
Missouri.....	1,843	49,275	6,265	267,632	2,697	26,558	5,708	55,573	652	8,595
Montana.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nebraska.....	90	1,000	9	600	.....	.....	.....	.....	.....	.....
New Hampshire.....	665	9,875	.....	.....	2,438	32,840	.....	.....	855	11,595
New Jersey.....	1,249	28,638	69	2,280	.....	.....	.....	.....	132	2,980
New York.....	51,686	538,123	141	5,185	51,436	757,153	70	1,075	26,673	1,480,435
North Carolina.....	.....	.....	100	2,785	20	200	.....	.....	45	425
North Dakota.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ohio.....	87,175	1,598,063	6,867	262,676	20,916	277,400	4,134	51,892	38,910	477,694
Oklahoma.....	.....	.....	13	231	.....	.....	1	14	45	510
Oregon.....	.....	.....	.....	.....	852	11,995	.....	.....	12	198
Pennsylvania.....	10,364	165,472	376	14,019	49,850	624,518	.....	.....	40,892	568,320
Rhode Island.....	.....	.....	10	280	16	240	.....	.....	.....	.....
South Carolina.....	1,709	16,470	.....	.....	.....	.....	.....	.....	.....	.....
South Dakota.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee.....	266,862	3,690,396	4,315	83,166	445	3,924	3,437	33,516	2,436	28,577
Texas.....	971	3,842	63	1,010	50	750	.....	.....	100	1,000
Vermont.....	86,143	1,049,892	296	8,966	16,992	220,508	.....	.....	5,088	67,115
Virginia.....	193,119	2,804,706	150	3,819	84	1,030	236	2,735	619	7,460
Washington.....	2,489	25,902	140	1,717	2,000	84,000	.....	.....	1,937	26,381
West Virginia.....	.....	.....	.....	.....	50,427	649,282	5	60	1,188	15,941
Wisconsin.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total—U. S.....	1,115,242	\$15,646,331	39,681	\$1,411,611	638,466	\$7,495,052	29,715	\$397,938	208,504	\$4,015,948

No product reported for Alaska, Arizona, Idaho, Nevada, New Mexico, Utah and Wyoming.

UNITED STATES—LUMBER PRODUCTION.

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SHINGLE PRODUCT, BY STATES AND TERRITORIES, 1900.

States and Territories.	Total.		White pine.		Cypress.		Cedar.		Redwood.		Other conifers.		All hardwoods.	
	M.	Value.	M.	Value.	M.	Value.	M.	Value.	M.	Value.	M.	Value.	M.	Value.
Alabama.....	267,273	\$ 463,357	.....	.....	155,509	\$ 289,652	.....	.....	.....	.....	111,234	\$ 172,785	680	\$ 920
Arizona.....	850	.....	.....	.....	.....	.....	.....	.....	.....	.....	850	895	350	.....
Arkansas.....	349,622	597,855	.....	.....	314,196	583,224	.....	.....	.....	.....	85,228	64,446	100	185
California.....	660,090	668,115	.....	.....	.....	.....	.....	.....	680,122	\$ 692,298	19,968	80,822	.....	.....
Colorado.....	6,165	8,902	.....	.....	.....	.....	.....	.....	.....	.....	6,115	8,752	60	150
Conn.....	3,214	8,968	968	\$ 2,359	.....	.....	225	\$ 675	.....	.....	280	681	1,761	4,928
Delaware.....	80	150	.....	.....	.....	.....	.....	.....	.....	.....	80	150	.....	.....
Florida.....	177,128	858,838	.....	.....	126,697	280,618	.....	.....	.....	.....	80,428	75,720	.....	.....
Georgia.....	248,777	379,957	.....	.....	20,894	44,772	.....	.....	.....	.....	221,991	384,110	912	1,075
Idaho.....	15,806	24,344	.....	.....	.....	.....	14,375	20,599	.....	.....	1,431	8,745	.....	.....
Illinois.....	42,825	73,378	.....	.....	560	1,025	.....	6,910	.....	.....	.....	.....	7,910	10,661
Indiana.....	84,198	92,877	.....	.....	.....	.....	2,509	.....	.....	.....	.....	.....	29,769	83,077
Iowa.....	66,140	137,712	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	41,150	79,948
Kentucky.....	59,375	115,468	.....	.....	16,000	81,825	.....	.....	.....	.....	2,225	4,200	.....	.....
Louisiana.....	604,819	785,901	.....	.....	455,654	728,231	882,816	666,414	.....	.....	109,165	62,670	135	189
Maine.....	465,962	903,499	.....	.....	.....	.....	.....	.....	.....	.....	42,715	181,844	3,628	12,821
Maryland.....	22,524	66,328	.....	.....	450	2,300	2,140	6,098	.....	.....	9,546	22,782	160	815
Mass.....	20,500	46,694	.....	.....	.....	.....	1,023,008	2,468,812	.....	.....	29,898	45,794	3,591	6,710
Michigan.....	1,026,110	8,219,610	.....	.....	.....	.....	21,778	26,759	.....	.....	11,781	22,817	420	600
Minnesota.....	498,900	683,207	.....	.....	14,610	81,945	.....	.....	.....	.....	17,417	82,061	.....	.....
Mississippi.....	32,027	64,006	.....	.....	8,890	8,190	.....	.....	.....	.....	8,764	10,614	678	1,785
Missouri.....	28,227	45,292	.....	.....	.....	.....	.....	.....	.....	.....	15,802	8,116	.....	.....
Montana.....	6,890	11,518	.....	.....	.....	.....	8,300	6,100	.....	.....	8,520	6,268	.....	.....
New Ham.....	40,499	75,417	.....	.....	.....	.....	6,229	11,076	.....	.....	8,807	4,205	580	8,680
New Jersey.....	33,335	146,281	.....	.....	.....	.....	82,448	138,946	.....	.....	4,800	8,960	.....	.....
N. Mexico.....	4,800	8,960	.....	.....	.....	.....	.....	.....	.....	.....	107,718	215,415	8,918	9,542
New York.....	160,294	842,414	.....	.....	.....	.....	19,468	47,846	.....	.....	118,860	224,391	1,261	2,747
N. Caro.....	212,467	513,320	.....	.....	63,476	179,708	28,890	106,476	.....	.....	605	1,182	9,795	23,170
Ohio.....	13,605	33,988	.....	.....	.....	.....	175	530	.....	.....	.....	.....	108	255
Oklahoma.....	108	265	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oregon.....	81,189	45,959	.....	.....	.....	.....	26,119	84,299	.....	.....	6,070	11,660	.....	.....
Penn.....	869,858	866,435	.....	.....	.....	.....	2,785	7,215	.....	.....	250,380	527,604	81,921	106,025
Rhode Isl.....	2,267	6,156	.....	.....	.....	.....	1,495	8,955	.....	.....	.....	.....	652	1,865
S. Carolina.....	88,378	155,177	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,400	8,250
S. Dakota.....	800	1,575	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee.....	59,785	107,198	.....	.....	.....	.....	1,227	2,387	.....	.....	.....	.....	.....	.....
Texas.....	210,683	315,143	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Utah.....	2,460	8,600	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vermont.....	52,899	105,659	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Virginia.....	27,784	62,299	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wash.....	4,837,992	5,833,487	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Va.....	34,350	58,299	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin.....	994,427	1,882,292	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wyoming.....	2,185	6,045	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total—U. S.	12,102,017	\$18,869,705	1,859,440	\$2,969,205	1,267,161	\$2,280,645	6,387,945	\$9,516,497	680,122	\$692,298	1,797,266	\$2,961,628	200,698	\$459,387

No product reported for Alaska, Indian Territory, Kansas, Nebraska, Nevada and North Dakota.

Rough lumber products have been given in the preceding series of tables, while the two following tables relate to other sawed products—pickets and palings, lath, sawed hoops, sawed staves and sawed headings. The states showing the highest values in both are those in which the soft pine industry is most highly developed. This is true of the items in the next succeeding table because they are manufactured in connection with lumber, from what otherwise would be mill refuse:

SAWED PRODUCTS, BY STATES AND TERRITORIES, 1900.

STATES AND TERRITORIES.	Pickets and palings.		Lath.	
	Quantity, M feet board measure.	Value.	Number of thousands.	Value.
Alabama.....	1,188	\$ 7,163	28,721	\$ 35,113
Arizona.....			2,040	4,200
Arkansas.....	497	3,915	21,164	37,531
California.....	2,343	21,640	11,507	23,508
Colorado.....			5,558	9,351
Connecticut.....	13	175	418	643
Delaware.....	6	45	1,130	2,097
Florida.....	608	1,814	31,761	43,051
Georgia.....	370	2,240	31,496	37,786
Idaho.....	30	400	3,220	8,940
Illinois.....	859	9,246	30,674	72,369
Indiana.....	3,073	34,482	10,138	23,003
Iowa.....	169	2,520	58,638	136,150
Kansas.....	8	25	4	10
Kentucky.....	1,534	15,942	17,091	41,537
Louisiana.....	1,840	23,175	99,852	156,532
Maine.....	689	7,336	217,376	364,654
Maryland.....	166	1,446	5,369	9,063
Massachusetts.....			8,807	23,483
Michigan.....	1,934	11,817	259,917	493,395
Minnesota.....			387,064	766,040
Mississippi.....	410	4,813	6,063	10,554
Missouri.....	806	7,736	24,835	38,236
Montana.....			14,231	22,378
Nebraska.....			1	2
New Hampshire.....	190	1,920	74,221	155,491
New Jersey.....	523	5,336	3,559	12,242
New Mexico.....			2,165	5,650
New York.....	290	3,358	66,468	124,963
North Carolina.....	988	7,901	48,782	74,919
Ohio.....	2,986	35,247	18,519	54,135
Oklahoma.....	34	360	75	180
Oregon.....	357	4,613	41,779	60,496
Pennsylvania.....	4,845	47,854	266,949	584,353
Rhode Island.....			16	18
South Carolina.....	302	3,125	26,311	36,772
South Dakota.....			1,856	5,340
Tennessee.....	673	8,365	33,199	81,991
Texas.....	893	8,640	4,181	4,856
Utah.....	64	706	793	2,163
Vermont.....			9,314	18,684
Virginia.....	898	6,217	36,502	64,573
Washington.....	822	6,234	145,134	176,925
West Virginia.....	684	6,183	58,440	107,132
Wisconsin.....	4,242	30,728	418,011	761,435
Wyoming.....	6	82	629	2,377
Total—United States.....	35,314	\$334,798	2,523,998	\$4,698,909

No report given for Alaska, Indian Territory, Nevada and North Dakota.

COOPERAGE MATERIALS.

The production of cooperage materials is a specialty of states whose timber is particularly adapted to this purpose. Thus, as shown by the following table, only thirty-two states were reported by the Twelfth Census as producing goods of this class. In staves the leading state was Michigan, followed by Ohio, Tennessee, Indiana, Pennsylvania and Arkansas, in the order given. Michigan's large product was largely due to its enormous salt production, which requires only an inferior quality of staves. The hardwood states were all heavy producers of this class of stock.

SAWED PRODUCTS—COOPERAGE MATERIALS, BY STATES AND TERRITORIES, 1900.

STATES AND TERRITORIES.	Total value.	Hoops.		Staves.		Heading.	
		Number of thousands.	Value.	Number of thousands.	Value.	Number of sets.	Value.
Alabama....	\$ 201,032	.....	.....	25,776	\$ 174,296	1,243,000	\$ 26,736
Arkansas....	2,249,126	8,220	\$ 90,100	109,056	1,853,401	4,887,650	305,625
California....	1,826	.....	.....	.....	.....	45,000	1,826
Delaware....	37,000	.....	.....	12,000	30,000	700,000	7,000
Florida.....	24,400	120	600	4,126	21,972	46,170	1,828
Georgia.....	21,337	.....	.....	3,309	17,656	226,760	3,681
Illinois.....	519,334	7,200	47,700	54,508	385,804	2,720,000	85,830
Indiana.....	2,388,197	88,310	617,710	160,084	1,244,266	13,081,947	526,221
Iowa.....	19,410	.....	.....	1,300	6,500	832,000	12,910
Kentucky....	1,376,568	.....	.....	63,346	1,042,523	3,522,504	234,045
Louisiana....	205,233	.....	.....	21,255	171,078	725,960	34,155
Maine.....	411,328	670	2,945	70,489	293,171	3,911,950	115,212
Maryland....	14,600	.....	.....	330	4,600	330,000	10,000
Mass.....	61,985	180	1,080	8,255	49,890	398,000	11,015
Michigan....	3,277,931	120,225	684,078	310,648	1,631,132	33,989,223	962,721
Minnesota....	137,450	7,611	55,200	7,012	33,780	1,316,583	48,476
Mississippi..	416,884	.....	.....	17,657	355,504	1,980,000	61,380
Missouri....	716,530	8,760	49,175	67,706	463,467	1,527,116	203,888
New Hamp....	39,160	.....	.....	8,419	34,120	318,000	5,040
New York....	638,740	12,371	94,746	42,585	259,008	8,534,260	284,986
N. Carolina..	29,680	.....	.....	4,543	26,368	83,300	3,312
Ohio.....	2,109,012	115,901	688,346	200,376	1,176,222	5,208,692	264,444
Penn.....	763,553	75	430	145,353	589,606	7,243,044	173,517
Rhode Isl....	100	.....	.....	20	100	.....	.....
S. Carolina..	32,007	300	2,400	3,813	21,807	278,000	7,900
Tennessee....	3,281,314	64,184	297,955	181,071	2,541,587	16,915,700	441,772
Texas.....	24,222	.....	.....	7,236	21,222	100,000	3,000
Vermont.....	21,285	.....	.....	2,050	21,285	.....	.....
Virginia.....	561,811	700	5,000	47,735	389,777	3,762,650	167,034
Washington..	62,499	500	3,000	3,684	41,974	334,600	17,525
W. Virginia..	393,650	200	1,000	32,795	361,784	918,839	30,866
Wisconsin....	777,466	5,800	48,000	48,255	433,721	8,408,499	295,745
Total—U. S.	\$20,714,670	441,327	\$2,669,465	1,664,792	\$13,697,621	124,089,447	\$4,347,584

No report was given for the following states: Alaska, Arizona, Colorado, Connecticut, Idaho, Indian Territory, Kansas, Montana, Nebraska, Nevada, New Jersey, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah and Wyoming.

TIMBER CAMP PRODUCTS.

The following three-part table, found on the three following pages, gives quantity and value for all the leading products of the timber

camps, except sawlogs. Cooperage stock includes rived staves, stave and heading bolts, etc. The first column of figures below is the total value of the product, including items not tabulated but which are mentioned in the footnote on this page:

TIMBER CAMP PRODUCTS—BY STATES AND TERRITORIES, 1900.

STATES AND TERRITORIES.	Total value.	Cooperage stock.		Fence posts.		Hewed timber.	
		Cords.	Value.	Number.	Value.	M feet b. m.	Value.
Alabama.....	\$128,500	2,100	\$ 8,500	87,988	\$ 3,625	2,989	\$20,336
Alaska.....	46,318						
Arizona.....	30,000						
Arkansas.....	227,995	14,903	51,212	170,320	8,066	723	14,500
California.....	748,215	1,612	6,640	447,310	30,350	4,065	29,500
Colorado.....	38,879			10,750	350		
Connecticut.....	342,402			51,600	6,677	171	1,728
Delaware.....	11,025			2,100	410		
Florida.....	266,645	200	1,400			275	2,470
Georgia.....	330,650	5,570	18,710	15,900	1,095	4,944	36,959
Idaho.....	185,406			62,100	1,810		
Illinois.....	166,683			64,910	5,785	36	580
Indiana.....	232,137	150	550	22,379	2,981	10	125
Indian Territory.....	1,000						
Iowa.....	23,107			13,450	1,055	2	30
Kansas.....	918			4,530	373		
Kentucky.....	178,205	4,100	28,000	12,357	1,510	550	5,500
Louisiana.....	199,984	100	400	10,000	600	324	5,140
Maine.....	118,846	2,370	13,000	500	30	1,560	11,225
Maryland.....	75,101			16,000	1,885		
Massachusetts.....	172,399			52,450	5,358		
Michigan.....	3,611,488	9,725	35,850	4,460,554	310,872	732	7,320
Minnesota.....	506,087	2,400	4,800	92,000	8,960		
Mississippi.....	142,787	5,130	40,150	43,400	4,330	608	7,596
Missouri.....	212,085	297	3,372	27,550	3,034	4,380	30,700
Montana.....	94,775			3,000	300	1,500	8,520
Nebraska.....	400			8,000	300		
New Hampshire.....	378,180	13,000	61,200	36,150	2,560	25	200
New Jersey.....	139,434			17,800	2,250		
New Mexico.....	103,150			3,616	550	794	10,100
New York.....	519,329	1,374	11,100	152,112	15,624	101	1,297
North Carolina.....	56,097	2,000	6,500	18,570	1,292	21	250
Ohio.....	529,330	1,333	9,600	109,035	11,233	392	5,200
Oregon.....	102,444			38,100	1,820		
Pennsylvania.....	2,584,567	6,335	12,122	253,318	23,849	6,728	87,781
Rhode Island.....	42,683			13,200	1,315		
South Carolina.....	68,140	1,155	1,200	5,600	572	11	70
South Dakota.....	38,840			12,000	440	3,160	30,000
Tennessee.....	189,503	2,080	7,925	63,625	7,607	532	6,534
Texas.....	180,647			14,000	933		
Utah.....	1,200					5	150
Vermont.....	36,416	10	200	5,200	308		
Virginia.....	371,516	4,552	19,235	85,632	11,409	3,738	15,560
Washington.....	416,732			14,000	400	750	4,500
West Virginia.....	168,123	50	150	12,400	1,167	436	3,872
Wisconsin.....	748,021	2,000	5,000	2,168,155	121,405		
Wyoming.....	511,025			16,000	1,725		
Total—United States.....	\$15,186,013	82,546	\$346,816	8,715,661	\$606,115	39,759	\$347,743

Included in "Total value" are the following items not specifically mentioned here: Basket stock, excelsior stock, hop poles, handle stock, paving stock, masts and spars, ship knees, wheel stock, charcoal, all other products and amount received for contract work.

No report given for Nevada, North Dakota and Oklahoma.

In the portion of the table on the next page regarding timber camp products, the railway ties, number and value, are hewn ties only, and do not include the much greater number which are sawed and included in the

sawed lumber product and are not reported separately to the census office by the manufacturers.

Telegraph poles are usually of cedar, and, therefore, states, like Michigan and Wisconsin, in which cedar is plentiful are the leading producers in this line. Rived and shaved shingles have so nearly been displaced by sawed shingles that in 1899 but 41,433,000 were manufactured, against 12,102,017,000 sawed. Pennsylvania is preëminent in the production of tanning barks, especially hemlock, which has made it the seat of the greatest tanning industry.

TIMBER CAMP PRODUCTS—BY STATES AND TERRITORIES, 1900—Continued.

STATES AND TERRITORIES.	Railway ties.		Rived or shaved shingles.		Telegraph poles.	
	Number.	Value.	Number of thousand.	Value.	Number.	Value.
Alabama.....	282,100	\$ 66,909	302	\$ 505	1,754	\$ 2,183
Alaska.....	.....	.....	.....	.....	.....	.....
Arizona.....	25,000	10,000	.....	.....	.....	.....
Arkansas.....	444,879	110,018	4,781	6,324	2,380	775
California.....	1,578,274	399,327	2,157	9,080	400	1,600
Colorado.....	97,600	29,074	.....	.....	.....	.....
Connecticut.....	464,225	160,122	150	300	31,910	86,680
Delaware.....	15,200	5,840	.....	.....	.....	.....
Florida.....	980,709	238,230	.....	.....	1,200	2,780
Georgia.....	823,285	204,588	2,000	5,000	2,150	10,205
Idaho.....	61,700	15,305	.....	.....	34,240	54,240
Illinois.....	470,714	141,851	250	550	1,408	3,018
Indiana.....	388,659	182,842	4,210	7,755	700	450
Indian Territory.....	.....	.....	300	500	.....	.....
Iowa.....	35,243	13,347	.....	.....	.....	.....
Kansas.....	.....	.....	.....	.....	.....	.....
Kentucky.....	343,254	89,712	8,988	10,627	1,000	2,000
Louisiana.....	674,537	187,065	290	897	.....	.....
Maine.....	84,500	17,025	.....	.....	4,235	5,185
Maryland.....	129,322	45,450	100	400	3,800	4,300
Massachusetts.....	149,479	54,474	708	1,368	16,640	26,668
Michigan.....	4,538,820	1,360,068	250	500	514,161	762,979
Minnesota.....	742,315	171,267	5,000	7,500	32,600	42,040
Mississippi.....	37,411	13,663	1,680	4,853	.....	.....
Missouri.....	559,822	151,481	1,375	2,280	.....	.....
Montana.....	351,500	81,405	.....	.....	.....	.....
Nebraska.....	.....	.....	.....	.....	.....	.....
New Hampshire.....	107,962	29,443	100	200	2,275	5,325
New Jersey.....	64,108	26,853	.....	.....	11,938	42,221
New Mexico.....	340,722	81,900	.....	.....	817	800
New York.....	225,115	86,145	6	18	9,824	14,210
North Carolina.....	37,123	10,239	1,880	5,050	16,200	23,000
Ohio.....	1,246,230	421,056	285	574	475	180
Oregon.....	99,400	20,000	.....	.....	2,495	1,127
Pennsylvania.....	1,394,500	473,091	199	779	32,647	63,380
Rhode Island.....	51,220	14,557	95	200	4,480	8,990
South Carolina.....	200,990	46,948	.....	.....	12,700	8,450
South Dakota.....	25,000	7,500	.....	.....	100	400
Tennessee.....	265,909	63,694	1,760	2,390	15,300	20,100
Texas.....	675,835	164,816	2,312	4,261	2,070	2,570
Utah.....	2,000	1,000	.....	.....	.....	.....
Vermont.....	10,723	3,305	.....	.....	.....	.....
Virginia.....	455,190	141,060	2,030	6,110	1,146	532
Washington.....	476,440	141,663	90	250	19,812	44,639
West Virginia.....	386,264	103,112	127	255	2,500	1,750
Wisconsin.....	951,135	256,500	.....	.....	151,808	148,769
Wyoming.....	2,320,000	507,200	.....	.....	3,500	2,100
Total—United States.....	22,591,894	\$6,298,633	41,433	\$78,326	937,963	\$1,393,576

TIMBER CAMP PRODUCTS—BY STATES AND TERRITORIES, 1900—Continued.

STATES AND TERRITORIES.	Hemlock bark.		Oak bark.		Pines.	
	Cords.	Value.	Cords.	Value.	Number.	Value.
Alabama.....	.....	.....	49	\$ 275	1,745	\$ 1,880
Alaska.....	.....	.....	.....	.....	.....	.....
Arizona.....	.....	.....	.....	.....	.....	.....
Arkansas.....	.....	.....	.....	.....	20,500	17,580
California.....	.....	.....	5,376	52,058	1,364	6,584
Colorado.....	.....	.....	.....	.....	.....	.....
Connecticut.....	25	\$ 100	.....	.....	7,380	16,503
Delaware.....	.....	.....	.....	.....	750	1,775
Florida.....	.....	.....	.....	.....	.....	.....
Georgia.....	.....	.....	2,000	10,000	5,500	3,980
Idaho.....	.....	.....	.....	.....	6,000	12,000
Illinois.....	.....	.....	.....	.....	14,375	9,809
Indiana.....	.....	.....	.....	.....	10,113	19,154
Indian Territory.....	.....	.....	.....	.....	.....	.....
Iowa.....	.....	.....	.....	.....	5,450	6,900
Kansas.....	.....	.....	.....	.....	.....	.....
Kentucky.....	.....	.....	2,175	17,060	250	425
Louisiana.....	.....	.....	.....	.....	400	500
Maine.....	4,497	13,952	.....	.....	.....	.....
Maryland.....	1,158	4,803	1,196	4,631	2,500	5,800
Massachusetts.....	188	724	.....	.....	1,080	2,065
Michigan.....	78,901	341,974	300	1,400	8,474	14,818
Minnesota.....	.....	.....	.....	.....	57,300	83,980
Mississippi.....	.....	.....	.....	.....	936	4,492
Missouri.....	.....	.....	.....	.....	5,283	6,307
Montana.....	.....	.....	.....	.....	2,000	3,000
Nebraska.....	.....	.....	.....	.....	.....	.....
New Hampshire.....	4,902	21,635	.....	.....	3,820	16,900
New Jersey.....	.....	.....	.....	.....	6,480	23,478
New Mexico.....	.....	.....	.....	.....	1,500	1,300
New York.....	32,048	139,197	144	478	4,054	7,946
North Carolina.....	40	120	85	424	480	1,315
Ohio.....	158	973	1,575	8,773	8,970	29,939
Oregon.....	.....	.....	.....	.....	17,829	14,277
Pennsylvania.....	330,633	1,341,767	14,384	69,865	36,564	61,903
Rhode Island.....	.....	.....	.....	.....	1,110	2,655
South Carolina.....	.....	.....	.....	.....	400	900
South Dakota.....	.....	.....	.....	.....	.....	.....
Tennessee.....	653	2,592	5,868	34,537	18,000	35,000
Texas.....	.....	.....	.....	.....	3,060	3,660
Utah.....	.....	.....	.....	.....	.....	.....
Vermont.....	1,967	8,558	75	400	.....	.....
Virginia.....	107	416	3,108	12,962	47,400	123,486
Washington.....	.....	.....	.....	.....	54,579	135,581
West Virginia.....	8,141	32,819	3,458	16,142	200	100
Wisconsin.....	11,904	36,627	50	75	40,823	83,322
Wyoming.....	.....	.....	.....	.....	.....	.....
Total—United States.....	473,222	\$1,945,452	39,844	\$228,900	396,629	\$758,945

CHAPTER XXXI.

UNITED STATES—FOREIGN TRADE.

The magnificent forests of the United States have played an important part in its march toward the goal which has placed it in the van of the great powers as an exporting nation.

It does not detract from the patriotism which inspired our forefathers in their rebellion against the mother country to note that it was not merely the injustice which they suffered that induced them to go to war, but also the belief that the colonies would never enjoy any just measure of prosperity so long as their exports and imports were regulated by a foreign power. That legislation which inspired rebellion dealt directly with the country's trade with other lands.

That the necessity for independence actually existed was demonstrated by a tremendous increase in her exports soon after the new republic had been formed. The balance of the trade had been overwhelmingly against her, but with favorable legislation at home and recognition abroad it eventually shifted, and the region that had been a buying community became also a selling one. It is one of the simplest laws of commercial life that profit is dependent upon a condition in which receipts exceed expenditures. This constitutes the whole question of prosperity, whether of the individual or of the nation.

EXPORTS IN EARLY DAYS.

In the shifting of the current of trade and the increase of American exports, wood products played a conspicuous part. The peace with England in 1783 found the United States comprising a strip of territory on the Atlantic Ocean extending from Maine—then a district of Massachusetts—to Georgia, and bounded on the west by the Mississippi River. The total area in 1790 was 239,935 square miles, with a population of 3,929,214. Yet in this comparatively limited area the lumber product gave large and profitable returns from its exportation.

British reports show that in 1731 the imports from the colonies of Virginia and Maryland already included a total of \$15,000 worth of timber. The lumber exports from the colonies in 1770, still some years previous to the outbreak of the American Revolution, were valued at

\$686,588. The exports of boards and scantling from Philadelphia in 1765 were 783,000 feet; in 1773, eight years later, they had increased to 4,075,000 feet.

"Before the War of Independence," says F. André Michaux, in his *North American Sylva*, published in 1810-13, "England is said to have furnished herself with masts [white pine] from the United States, and she still [about 1810] completes from America the demand which cannot be fully supplied from the North of Europe. The finest timber of this species is brought from Maine and particularly from the river Kennebeck." Continuing, Michaux says:

Soon after the establishment of the colonies England became sensible of the value of this resource and solicitous for its preservation. In 1711 and 1721 severe ordinances were enacted, prohibiting the cutting of any trees proper for masts on the possessions of the Crown. The order comprised the vast countries bounded on the south by New Jersey and on the north by the upper limit of Nova Scotia. I am unable to say with what degree of rigor it was enforced before the American Revolution, but for a space of 600 miles, from Philadelphia to a distance beyond Boston, I did not observe a single stock of the white pine large enough for the mast of a vessel of 600 tons.

. . . In a table of importations from the United States presented to the Parliament of Great Britain, the timber introduced in 1807 is reckoned at \$1,302,960, of which I suppose the white pine to have formed one-fifth. In 1808 it was sold at Liverpool at about sixty cents a cubic foot. Planks two inches thick and twelve inches wide were worth four cents a foot and common plank six cents.

In this statement the wood imported from New Brunswick is not included nor the vast quantities sent from the United States to the West Indies not dependent on Great Britain.

American wood products suffered less from restrictive legislation than perhaps any other commodity. The mother country welcomed the wealth of our forests, but she reserved to herself the privilege of manufacturing this raw material into the finished products. After the formation of the republic the increase in manufactured goods in proportion to raw material exported was marked.

Early in the Nineteenth Century immense quantities of hickory hoops were exported to the West Indies. Michaux says that, "Of the numerous trees of North America east of the Allegheny Mountains none but the hickory is perfectly adapted for the making of hoops for casks and barrels. For this purpose vast quantities of it are consumed at home and exported to the West Indies Islands. The hoops are made from young hickory from six to twelve feet high, without choice as to species. The largest hoop poles sold at Philadelphia and New York in

February, 1808, at \$3 per hundred. For hand spikes the hickory is in particular esteem on account of its strength. It is accordingly employed in most American vessels, and is exported for the same purpose to England, where it sells from 50 to 100 percent higher than ash."

The following excerpts from Michaux's *Sylva* will prove interesting and instructive, as showing quantities and values of several commodities exported in the latter part of the Eighteenth and the early portion of the Nineteenth centuries. Mr. Michaux stated that vast quantities of white oak staves were exported to the West Indies, Great Britain and the islands of Madeira and Tenerife. He said:

White oak staves are exported from all ports of the northern and southern states and New Orleans. . . . The quantities of oak staves exported to England and the West Indies appears by two official documents I have examined to be considerable. In 1808 the volume received by England amounted to more than 146,000, and the number of staves sent to the West Indies 53,000,000. I am unable to fix the proportion of the two species of the white and red oak, probably more of the first are sent to England and of the second to the colonies. The price of both has varied surprisingly within a hundred years. In 1720 staves for barrels were sold at Philadelphia at \$3 per thousand; in 1798 at \$18. In August, 1807, before the American embargo, they were advertised at \$55 and in April, 1808, after that regulation became known, at \$100.

The greater part of the immense quantity of white oak exported from the United States is sent to England. It is shipped from the north and middle states in the form of boards and square timber. What goes to England from Quebec is brought from the shores of Lake Champlain, while Canada probably furnishes hardly enough for its own consumption. By an extract from the custom house books of St. John (on the Sorel River), which I have already quoted, 143,000 cubic feet of oak would appear to have entered by this port during the first six months of 1807.

The long-leaved pine is the only species exported from the southern states to the West Indies, and numerous fleets of small vessels are employed in this traffic, particularly from Wilmington, in North Carolina, and Savannah, in Georgia. The stuff destined for the colonial market is cut in every form for the construction of houses and vessels. What is sent to England is in planks from fifteen to thirty feet long and ten to twelve inches in diameter. They are called "ranging timbers." The vessels freighted with this timber repair chiefly to Liverpool, where it is said to be employed in the building of ships and wet docks. It is called Georgia pitch pine, and is sold 25 percent or 30 percent higher than any other pine imported from the United States.

The yellow pine boards from 1 inch to 2½ inches thick form a considerable article of exportation to the West Indies and Great Britain. In the advertisements of Liverpool it is designated by the name of New York pine, and in those of Jamaica by that of yellow pine. In both places it is sold at a much lower price than the long-leaved pine of the southern states, but much higher than the white pine.

Referring to the turpentine business, Mr. Michaux said:

In November, 1807, the pure dipping (highest grade) was sold at Wilmington at \$3 a barrel, and the scraping at a quarter less. In 1804 the exportations of the northern states and to the English possessions amounted to 77,827 barrels. During the peace it comes even to Paris, where it is called "Boston turpentine." Throughout the United States it is used to make yellow soap of a good quality. The consumption in England is great and in the official statements of value imported in 1807 is \$465,828. In 1806 Liverpool alone received 40,294 barrels, and in 1807 18,924 barrels. It sold there in August, 1807, at \$3 a hundred pounds and after the American embargo, 1808, at \$8 and \$9.

A great deal of spirits of turpentine is made in North Carolina. . . . In 1804, 19,526 gallons were exported from North Carolina. The residuum of the distillation is rosin, which sold at one-third of the price of turpentine. The exportation of this substance in 1804 was 4,675 barrels.

In 1807 tar and pitch were exported to England from the United States to the amount of \$265,000. Tar was sold at Liverpool in August of the same year at \$4.67 a barrel.

EFFECT OF EMBARGO ACT AND WAR OF 1812.

From the earliest date contemplated in the tables subjoined to this article there has been a steady growth of our exports. But twice have American wood products suffered materially, and both were the result of our own initiative—the Embargo Act of 1808 and the war of 1812. As the result of the hostile actions of Great Britain and France against the United States, the Embargo Act became effective in 1808. The mischievous results of this act became evident in the decrease of the timber exportations from \$48,699,572 in 1806-7 to \$4,433,546 in 1807-8, and it was repealed in February, 1809, the Non-intercourse Act taking its place. This act excluded all public and private vessels of France and England from American waters, and gave the President authority to reopen by proclamation the trade with France and England in case either of these countries should cease to violate mutual rights. The year 1809 proved the Non-intercourse Act ineffective, however, and the folly of these acts was soon recognized and the experiment has never been repeated. The effects of the Embargo Act are told by H. Adams in his History of the United States. Though partisan and violent in its tone, it gives a vivid picture of the conditions. He says:

. . . Personal liberties and rights of property were more directly curtailed in the United States by embargo than in Great Britain by centuries of almost continuous foreign war. . . . While the constitutional cost of the two systems was not altogether unlike, the economical cost was a point not easily settled. No one could say what might be the financial expense of embargo as compared with war. Yet Jefferson himself in the end admitted that the embargo had no claim to re-

spect as an economical measure. . . . As the order was carried along the sea-coast, every artisan dropped his tools, every merchant closed his doors, every ship was dismantled. American produce—wheat, timber, cotton, tobacco, rice—dropped in value or became unsalable; every imported article rose in price; wages stopped; swarms of debtors became bankrupt; thousands of sailors hung idle round the wharves trying to find employment on coasters, and escape to the West Indies or Nova Scotia. A reign of idleness began; and the men who were not already ruined felt that their ruin was only a matter of time. The British traveler, Lambert, who visited New York in 1808, described it as a place ravaged by pestilence: "The port indeed was full of shipping, but they were dismantled and laid up; their decks were cleared, their hatches fastened down, and scarcely a sailor was to be found on board. Not a box, bale, cask, barrel or package was to be seen upon the wharves." . . . In New England where the struggle of existence was the keenest, the embargo struck like a thunderbolt, and society for a moment thought itself at an end. Foreign commerce and shipping were the life of the people, the ocean, as Pickering said, was their farm. The outcry of suffering interests became every day more violent, as the public learned that this paralysis was not a matter of weeks, but of months or years. . . . The belief that Jefferson, sold to France, wished to destroy American commerce and to strike a deadly blow at New and Old England at once, maddened the sensitive temper of the people. Immense losses, sweeping away their savings and spreading bankruptcy through every village, gave ample cause for their complaints. Yet in truth, New England was better able to defy the embargo than she was willing to suppose. She lost nothing except profits which the belligerents had in any case confiscated; her timber would not harm for keeping, and her fish were safe in the ocean. The embargo gave her almost a monopoly of the American market for domestic manufactures; no part of the country was so well situated or so well equipped for smuggling. . . . The growers of wheat and live stock in the middle states were more hardly treated. Their wheat, reduced in value from two dollars to seventy-five cents a bushel, became practically unsalable. . . . The manufactures of Pennsylvania could not but feel the stimulus of the new demand; so violent a system of protection was never applied to them before or since. Probably for that reason the embargo was not so unpopular in Pennsylvania as elsewhere, and Jefferson had nothing to fear from political revolution in this calm and plodding community. The true burden of the embargo fell on the southern states, but most severely upon the great State of Virginia. Slowly decaying, but still half patriarchal, Virginia society could neither economize nor liquidate. Tobacco was worthless; but 400,000 negro slaves must be clothed and fed, great establishments must be kept up, the social scale of living could not be reduced, and even bankruptcy could not clear a large landed estate without creating new encumbrances in a country where land and negroes were the only forms of property on which money could be raised. Staylaws were tried, but served only to prolong the agony. With astonishing rapidity Virginia succumbed to ruin, while continuing to support the system that was draining her strength.

The high-handed manner in which England boarded American ships on the high seas, on the claim that she had the right to overhaul both

merchantmen and war vessels, and seize and force into the English service sailors who could not prove their nationality, was one of the causes which led up to the proclamation of war against that country by President Madison on June 18, 1812. The following table shows exports of wood products from 1807 to 1816 and the effect the Embargo and Non-intercourse acts and the War of 1812 had on the same:

STATEMENT OF WOOD EXPORTS FOR TEN YEARS—1807-1816—SHOWING EFFECT OF EMBARGO ACT AND WAR OF 1812-14 ON SAME.

Year.	Logs: sawed and hewn timber, feet.	Shingles, number.	Sawed lumber, feet.	Masts and spars, value.	Hoops and poles, number.	All other lumber, value.	Staves and headings, number.	Furni- ture, value.	All other manu- factured wood, value.
1807.	48,855	76,890,000	79,424,000	\$ 21,084	3,821,000	\$282,251	37,701,000	\$113,571	\$
1808.	7,412	17,512,000	25,845,000	2,088	2,186,000	66,051	10,003,000	34,231	.....
1809.	29,342	34,047,000	64,725,000	19,146	3,419,000	178,396	26,991,000	71,232	.....
1810.	103,294	43,122,000	63,042,000	141,163	3,250,000	243,455	27,137,000	131,484	.....
1811.	116,428	69,097,000	85,340,000	108,020	2,240,000	315,965	30,284,000	148,758	190,635
1812.	42,442	30,327,000	56,565,000	10,971	2,392,000	224,338	18,285,000	43,248	109,635
1813.	1,671	10,750,000	20,699,000	1,522	1,888,000	6,979	7,179,000	2,230	61,137
1814.	127	4,106,000	11,646,000	435	1,064,000	2,673	2,671,000	2,526	49,462
1815.	7,696	25,419,000	51,337,000	17,389	3,373,000	77,647	16,743,000	52,278	150,660
1816.	32,447	78,919,000	63,162,000	195,513	3,564,000	311,212	49,239,000	114,847	199,635

Brief mention of the effects the reciprocal treaty of 1854 with Canada and the Civil War had on the exports of wood products will be of interest. The reciprocity treaty of 1854 with Canada took effect March 16, 1855, and continued in operation until March 17, 1866. Statistics of principal exports to Canada during the life of the treaty and for one year preceding and two years following the same are here given:

STATEMENT OF PRINCIPAL EXPORTS TO CANADA, 1853-1868, SHOWING EFFECTS OF RECIPROCITY TREATY WITH THAT COUNTRY.

Year.	Timber, hewn, tons.	Shingles, thou- sands.	Sawed lumber, thou- sands of feet.	Staves and head- ings, thou- sands.	Other lumber, value.	Furniture, value.	All other manufac- tures, value.
1853.	11,580	622	2,436	136	\$ 7,516	\$ 90,383	\$126,619
1854.	8,729	421	2,208	553	11,517	192,450	204,432
1855.	6,824	947	4,414	4,300	8,654	269,995	360,210
1856.	7,306	1,529	7,418	1,366	23,881	401,656	287,730
1857.	11,926	21,743	88,435	633	3,116	253,329	206,002
1858.	5,392	15,194	29,625	9,501	77,878	224,816	231,347
1859.	1,445	2,717	6,132	944	43,957	237,721	148,867
1860.	2,582	714	2,444	605	31,004	200,128	125,178
1861.	387	107	1,873	440	17,575	186,328	106,475
1862.	.....	381	7,481	175	3,820	264,460	91,199
1863.	290	221	6,037	269	14,782	178,308	120,383
1864.	11	322	5,017	630	11,513	237,920	179,443
1865.	1,392	305	4,665	140	45,076	197,880	100,781
1866.	1,351	1,086	5,051	75	50,297	344,021	74,754
1867.	5,411	1,237	2,372	156	3,766	200,652	150,129
1868.	9,936	1,913	6,401	225	25,785	172,764	155,725

¹ Firewood.

During the Civil War the pitch pine of the South seems to have been about the only loser among the different woods as an exporting quantity, for, with the exception of the years 1861 and 1862, our exportations continued to grow until in 1865 forest products had reached the high water mark of 13 percent of total all exports. This was owing to the fact that no cotton was exported during the later years of the war. This percentage had not been approached before that time, nor has it been reached since. Truly, a most remarkable achievement, considering the country was torn asunder by internal strife. The value of exports for 1865 was \$17,422,457. The following table shows total values of exports from 1860 to 1866 inclusive:

VALUES OF FOREST PRODUCTS EXPORTED DURING THE CIVIL WAR.

YEAR	Value of Forest Products.		Total.
	Unmanufactured.	Manufactured.	
1860.....	\$ 6,249,768	\$3,782,209	\$10,031,977
1861.....	4,700,805	3,182,128	7,882,933
1862.....	5,955,261	2,698,247	8,653,508
1863.....	8,123,773	3,531,064	11,654,837
1864.....	9,748,280	2,306,332	12,054,612
1865.....	13,996,959	3,425,498	17,422,457
1866.....	11,544,163	1,858,729	13,402,892

An analysis of American wood products exported shows a steady increase from the time the first shipload of deals was sent across the water. At first the kinds of wood exported were limited in number, but shipments have grown in diversity and increased in magnitude until now they bring to the nation no unimportant part of the stream of gold flowing across the great waters which nearly surround the present United States. For the year ended September 30, 1792, there were exported only 1,171 tons of sawed timber, of which 1,134 tons went to the British Isles. Of logs and other timber 19,391 tons were shipped abroad, the British Isles taking 16,506 tons. During the same year were exported 71,637,863 shingles, 30,712,342 going to the British West Indies, 31,583,229 to the French West Indies and 4,548,737 to the Dutch West Indies. Of the 52,455,907 feet of boards, deals, planks, joists and scantling sent abroad, 7,342,005 went to the British Isles, 12,642,358 to the British West Indies, 21,329,292 to the French West Indies and 4,907,386 to the Dutch West Indies. Only 1,245 hogsheads and barrels were exported, but the exports of staves and headings were large, for there was a strong demand for barrel stock abroad. The

shipments in that year were 29,197,309 staves and headings, 9,365,734 going to the British Isles, 4,991,679 to the French West Indies, 8,299,266 to the British West Indies, 3,000,191 to Spain and 570,174 to France. During the same period 47,615,000 shooks were sold—to the French West Indies, 34,841,000; Dutch West Indies, 4,566,000; West Indies generally, 5,994,000, and to the British West Indies, 231,000. Of miscellaneous lumber stock 2,793,249 pieces were shipped; 219,646 pieces going to the British Isles, 1,221,450 to the French West Indies, 184,772 to the Danish West Indies, 82,567 to the British West Indies and 290,779 to the Dutch West Indies.

Space will not permit of following the history of United States wood exports year by year from the beginning, but the subjoined tables cover all the classes in different forms. At this point, however, it will be interesting to show the growth of some of the principal commodities from the early years of the last century down to the present time. This is done in the following table, taking the first year of each decade, beginning with 1821:

PRINCIPAL WOOD PRODUCTS EXPORTED FOR THE FIRST YEAR OF EACH OF NINE DECADES, BEGINNING WITH 1821.

YEAR.	Timber, hewn and sawed, tons.	Shingles, thous- ands.	Sawed lumber, thousand feet.	Hogs- heads and barrels (empty), value.	Masts and spars, value.	Other lumber, value.	Staves and headings, thousands.	Shooks, value.
1821....	15,220	53,583	76,244	.....	\$ 54,627	\$ 90,521	25,506	\$
1831....	32,335	23,122	65,045	.....	7,806	214,105	22,838	.....
1841....	61,249	37,759	93,049	.....	58,991	266,175	42,507	.....
1851....	13,372	34,871	100,604	.....	70,095	205,190	33,006	.....
1861....	8,821	30,078	132,332	¹ \$ 145,565	² 56,361	441,979	73,408	³ 2,516,457
1871....	Cubic feet. 7,115,007	23,254	154,830	292,561	⁴ 244,682	262,366	⁵	74,961,518
1881....	22,961,618	60,790	320,602	155,662	774,901	1,231,355	.....	3,212,640
1891....	24,784,406	42,463	642,730	240,430	⁴ 2,374,102	896,133	⁶ 2,404,213	650,166
1901....	49,118,031	39,255	1,087,801	117,442	3,608,092	4,422,384	3,895,009	1,472,709

¹ Records begin with 1864. ² For 1864; no record for 1861. ³ Classed under logs, masts, spars and other whole timber. ⁴ Classed as logs and other. ⁵ Included in shooks for 1871 and 1881. ⁶ For 1864; no record for 1861. ⁷ 1871 and 1881 include staves and headings.

The above résumé brings us down to the years 1902, 1903 and 1904, and a comparison of the values of exports of these years shows that in 1902 the value of wood products shipped was \$51,836,458; in 1903, \$63,206,491, and in 1904, \$61,253,793. It will be seen that while exports were nearly \$2,000,000 less in 1904 than in the previous year they were nearly \$10,000,000 more in 1904 than in 1902. The loss in 1904, as compared with the previous year, is found chiefly in timber, in sash and

doors and furniture, while the important increase was in sawed lumber. The following table shows the totals in the different principal classes for the three years:

VALUES OF FOREST PRODUCTS EXPORTS FOR THREE YEARS.

CLASSES.	1902.	1903.	1904.
Timber and unmanufactured wood.....	\$11,127,201	\$14,140,109	\$12,070,477
Sawed lumber.....	18,372,007	26,312,453	27,784,903
Shingles.....	79,749	94,651	69,829
Shooks.....	1,423,867	1,665,297	1,833,847
Staves.....	4,642,173	3,546,851	4,384,760
Heading.....	134,126	160,872	172,067
All other unmanufactured.....	3,719,471	3,652,193	2,826,994
Total unmanufactured.....	\$39,398,594	\$49,572,426	\$49,142,707
Sash, doors and blinds.....	\$ 1,194,699	\$ 1,850,608	\$ 981,126
Furniture.....	4,196,639	4,707,802	4,314,492
Hogsheads and barrels.....	150,789	205,275	207,930
House trim.....	555,358	599,691	527,840
Woodenware.....	830,023	982,709	879,823
Wood pulp.....	609,250	600,488	405,793
All other manufactures.....	4,901,106	4,687,497	4,794,083
Total wood manufactures.....	\$12,437,864	\$13,634,065	\$12,111,066
Total wood exports.....	\$51,836,458	\$63,206,491	\$61,253,793

The decrease shown in the timber and logs is wholly accounted for in the decrease of exportations to the United Kingdom, which were valued at \$4,080,520 in 1904 as against \$6,339,343 in 1903. This decrease was offset by important increases in other commodities.

In sawed lumber, which includes boards, deals, planks, joists and scantling, were important increases in exports to the United Kingdom, Belgium, British Australasia and British Africa. Increases of more or less importance, some of them heavy from a percentage basis, are seen in exports to France, Italy, British North America, Mexico, Cuba and Argentina. Decreases to the United Kingdom and its dependencies in some commodities are probably accounted for by the increase in trade within the British Empire, Canada increasing its business with Great Britain and its colonies in many lines.

Wood pulp exports show a steady decrease year after year in both quantity and value, the drop in 1904 as compared with the year previous being especially heavy. In 1903 the country exported 30,552,552 pounds of wood pulp, but only 20,172,901 pounds in 1904.

Going back to sawed lumber we find that exports in 1904 in quantity were 1,451,401,000 feet board measure, as against 1,325,522,000 feet in 1903 and 977,816,000 feet in 1902. Thus the United States is supplying year by year a larger proportion of the world's requirements in the way of forest products.

The following table gives the aggregate quantity and value for each of the three years ending with 1904:

QUANTITY AND VALUE OF SAWED LUMBER EXPORTS.

YEAR.	Quantity, feet.	Total value.
1902.....	977,816,000	\$18,272,007
1903.....	1,325,522,000	26,312,453
1904.....	1,451,401,000	27,784,908

The leading customers for the forest products of the United States and the quantity taken by each in 1902, 1903 and 1904 were as follows:

LEADING CUSTOMERS FOR AMERICAN SAWED LUMBER.

COUNTRY.	1902, feet.	1903, feet.	1904, feet.
United Kingdom.....	165,184,000	211,420,000	195,384,000
Germany.....	38,358,000	67,441,000	68,353,000
Netherlands.....	60,779,000	88,221,000	86,919,000
British North America.....	95,425,000	160,386,000	183,656,000
Mexico.....	100,139,000	103,997,000	126,689,000
Cuba.....	89,151,000	71,549,000	104,560,000
Argentina.....	88,968,000	106,135,000	182,449,000
British Australasia.....	66,066,000	89,180,000	89,685,000

The story of the growth of furniture exports is an interesting one, not so much for the volume it has reached in dollars and cents—although in 1904 the total value of all countries had reached \$4,555,411—as in the fact that the countries who are the heaviest buyers today did not purchase any of this commodity in the earlier years. During 1791 furniture was exported to the value of \$11,116. The West Indies were the heaviest buyers, and Florida and Louisiana—then foreign countries—are mentioned as buying thirty-five pieces. In 1795 the British American colonies bought thirty-six pieces, and the year following \$75 worth. In 1799 Florida and Louisiana bought furniture to the value of \$10,714; the British American colonies, \$1,609; Spanish West Indies, \$46,325; Dutch West Indies, \$25,067, and Ireland and Scotland \$300 and \$100, respectively. In 1811 furniture was exported to the value of \$148,758 and in 1812 \$43,248, but in the next two years the exports dropped to almost nothing—\$2,230 in 1813 and \$2,526 in 1814; this was during the second war with England.

Texas began importing furniture from the United States in 1837, when it purchased \$21,082 worth, and from that year until the time it was admitted to the Union, December 29, 1845, furniture to the value of \$166,325 was shipped to that country.

To demonstrate the growth of the United States furniture trade with foreign countries the following table by decades, beginning with the year 1821, has been compiled, which shows principal countries receiving this product:

EXPORTS OF FURNITURE BY PRINCIPAL COUNTRIES—1821-1905.

YEAR.	British Isles.	British North America.	Germany.	British Australasia.	Brazil.	Cuba.	Mexico.	Total all countries.
1821.....	\$.....	\$ 1,233	\$.....	\$.....	\$ 9,877	\$ 63,610	\$.....	\$ 173,436
1831.....	26	8,710	80	.....	31,180	40,172	45,523	229,231
1841.....	214	13,706	1,212	4,101	37,503	65,710	18,658	310,105
1851.....	2,382	39,514	1,634	196,272	13,590	58,783	30,866	362,830
1861.....	10,665	196,328	759	78,460	32,038	156,691	15,124	638,049
1871.....	46,629	316,692	6,055	60,456	55,710	46,773	42,054	1,110,091
1881.....	213,546	341,192	100,232	229,357	73,398	63,852	86,266	1,394,209
1891.....	557,880	346,446	254,463	271,572	125,788	108,988	174,369	2,956,114
1901.....	1,089,030	433,653	149,002	354,445	20,845	333,311	466,418	3,951,498
1902.....	999,145	494,293	171,849	253,708	15,872	311,596	560,774	4,125,923
1903.....	873,183	608,798	157,549	187,398	15,513	265,205	663,479	4,484,309
1904.....	823,428	739,756	189,497	192,565	24,951	420,477	612,433	4,555,411
1905 ¹	651,325	717,982	124,442	232,652	28,885	567,809	647,475	4,439,944

¹ None reported in 1851, but the amount given was exported in 1853.

² Preliminary figures.

In compiling the subjoined table of exports and imports of the timber industry from statistics prepared by the Treasury Department and the Department of Commerce and Labor, great difficulties were encountered, by reason of the fact that the early records were very incomplete, and all records, even down to the present time, vary materially as to arrangement and the items selected at different periods for specific mention.

Until the year 1866 all the statistics covering commerce and navigation were compiled under the direction and supervision of the Registrar of the Treasury. By an act of July 28, 1866, the Bureau of Statistics was organized, and the work has been carried on by that bureau, now a part of the Department of Commerce and Labor, beginning with the report of 1866-7, up to the present time, although it was not made a permanent bureau until some time later. Attention is called to the fact that up to the period named statistics compiled were, in many respects, very faulty. For example, overland exports of lumber and other materials to Canada were but partially reported and shown.

Alexander Delmar, the first director of the bureau, has the following to say in the premises: "Numerous statistical tables had been called for both by law and regulations. Of these but few—the import, export, re-export, indirect trade and shipping tables—were regularly compiled and published, and these few were faulty, though to what extent faulty

was not known, even by those who compiled them. A careful scrutiny has resulted in the discovery that in the imports were included the products of our fisheries, the guano brought from islands covered by our flag, . . . and even a portion of the products of the State of Maine—as though the same had been received from foreign countries and were so many national purchases to be paid for with an export of money, credit or trade. The entire transit and transshipment trade was likewise thrown into the import tables, sometimes counterbalanced by appropriate entries in the exports, but more often not. The domestic exports were largely understated. Overland exports to Canada were but partially given. Domestic manufactures were included in the table of foreign exports."

So it will be seen what a herculean task it has been to gather timber data under such conditions and from original reports that have been buried for decades under tons of other papers in the Government buildings in Washington.

For the early years the published statistics were all included in and compiled for the "State papers" sent to Congress. In copying from the original records, to secure the compilation, in some cases quantities were considered to be more important than values in the individual items, yet the values of all classes were combined to make the total values. Thus, it will be seen that the gross values are correct, even though they are not shown on the available records for each item. For example, for many years the items of "Boards, Deals, Planks, etc.," "Shingles," etc., were given in one value sum, yet the individual quantities only appear. Many of the compilations made in the following tables have been from manuscript books, the only copies extant for certain years.

The smallness of the total of forest products exported in 1843—\$1,846,253—is explained by the fact that the date of the fiscal year was changed by act of Congress August 26, 1842, from September 30 to June 30. Therefore, the report for 1843 covers the last quarter of the calendar year 1842 and the first two quarters of 1843.

PERCENTAGE OF FOREST PRODUCTS TO TOTAL DOMESTIC EXPORTATIONS.

The following compilation shows the values of the products of the forests, unmanufactured and manufactured, from the year 1817 down to the present time, and also percentage of the same to the total of all domestic exportations for the same period:

UNITED STATES—FOREIGN TRADE.

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EXPORTS OF FOREST PRODUCTS, VALUES AND RELATION TO TOTAL DOMESTIC EXPORTS.

YEAR.	Total all exports.	Exports forest products.			Percentage forest products of whole.
		Unmanufactured.	Manufactured.	Total.	
1817	\$ 68,313,500	\$ 3,195,029	\$ 303,115	\$ 3,498,144	5.01
1818	73,854,437	2,598,017	292,408	2,890,425	3.99
1819	50,976,838	2,466,338	299,639	2,765,977	5.04
1820	51,683,640	3,202,589	308,185	3,510,774	6.08
1821 ¹	43,871,894	1,512,808	349,151	1,861,959	4.02
1822	49,874,079	1,307,670	460,842	1,768,512	3.05
1823	47,155,408	1,335,600	388,400	1,724,000	3.06
1824	50,649,500	1,734,586	483,481	2,218,067	4.03
1825	66,944,745	1,717,571	425,022	2,142,593	3.02
1826	52,449,855	2,049,176	537,732	2,586,908	4.09
1827	57,878,117	1,607,170	520,301	2,217,471	3.08
1828	49,976,632	1,821,906	550,302	2,372,208	4.07
1829	55,087,307	1,698,171	442,028	2,140,199	3.08
1830	58,524,878	1,663,242	412,235	2,075,477	3.05
1831	59,218,583	1,688,976	504,450	2,193,426	3.08
1832	61,726,529	1,784,029	481,716	2,265,745	3.06
1833	69,950,856	2,250,852	519,276	2,770,128	3.09
1834	80,623,662	2,118,183	496,440	2,612,623	3.02
1835	100,459,481	2,911,525	682,322	3,593,847	3.05
1836	106,570,942	2,370,917	665,062	3,035,979	2.09
1837	94,280,895	2,615,400	709,570	3,324,970	3.05
1838	85,560,880	2,405,337	830,848	3,236,185	3.03
1839	101,625,533	2,635,412	1,021,131	3,656,543	3.05
1840	111,660,561	2,101,031	892,149	2,993,180	2.06
1841	103,636,236	2,874,978	858,413	3,733,391	3.06
1842	91,799,242	2,495,198	914,715	3,409,913	3.07
1843 ²	77,686,354	1,256,959	589,294	1,846,253	2.03
1844	99,531,774	2,022,498	1,247,038	3,269,536	3.02
1845	98,455,330	2,351,419	954,908	3,306,327	3.03
1846	101,718,042	2,666,104	1,275,197	3,941,301	3.08
1847	150,574,844	2,215,962	1,721,624	3,937,586	2.06
1848	130,203,709	2,843,056	2,340,053	5,183,109	4.00
1849	131,710,081	1,924,813	1,935,170	3,859,983	2.09
1850	134,900,233	2,597,015	2,226,777	4,823,792	3.06
1851	178,620,138	2,623,906	2,439,225	5,063,131	2.09
1852	154,931,147	2,893,558	2,623,267	5,516,825	3.05
1853	189,869,162	2,831,520	3,008,678	5,840,198	3.00
1854	215,328,300	5,418,534	3,599,829	9,018,363	4.01
1855	192,751,135	5,593,967	4,487,380	10,081,347	5.02
1856	266,438,051	5,056,433	3,483,625	8,540,058	3.02
1857	278,906,713	7,594,612	4,037,872	11,632,484	4.02
1858	251,351,033	7,532,421	3,167,177	10,699,598	4.02
1859	278,392,080	7,287,988	3,407,058	10,695,046	3.08
1860	316,242,423	6,249,768	3,782,209	10,031,977	3.01
1861	204,899,616	4,700,805	3,182,128	7,882,933	3.08
1862	179,644,024	5,955,261	2,698,247	8,653,508	4.08
1863	186,003,912	8,123,773	3,831,064	11,954,837	6.03
1864	143,504,027	9,748,280	2,306,332	12,054,612	7.07
1865	136,940,248	13,996,959	3,425,498	17,422,457	13.00
1866	337,518,102	11,544,163	1,858,729	13,402,892	4.00
1867	279,786,809	13,673,248	2,162,326	15,835,574	5.06
1868	269,389,900	12,115,153	2,265,164	14,380,317	5.03
1869	275,166,697	12,213,322	2,913,137	15,126,459	5.05
1870	376,616,473	11,398,407	2,336,431	13,734,838	3.06
1871	428,398,908	10,808,356	2,108,186	12,916,542	3.00
1872	428,487,131	12,542,989	2,697,883	15,240,872	3.05
1873	505,033,439	15,930,357	3,189,445	19,119,802	3.07
1874	569,433,421	17,698,544	3,655,177	21,353,721	3.07
1875	499,284,100	14,145,800	3,594,285	17,740,085	3.05
1876	525,582,247	13,812,878	3,483,397	17,296,275	3.03
1877	589,670,224	15,041,747	3,402,290	18,444,037	3.01
1878	680,709,268	12,812,588	3,963,823	16,776,411	2.04
1879	698,340,790	11,864,445	3,760,058	15,624,503	2.02
1880	823,946,353	12,523,711	3,713,665	16,237,376	2.00
1881	883,925,947	14,305,509	4,294,503	18,600,312	2.01

¹ Species included with merchandise prior to 1821.² Nine months ended June 30, 1843.

EXPORTS OF FOREST PRODUCTS, VALUES AND RELATIONS TO TOTAL DOMESTIC EXPORTS.—Continued.

YEAR.	Total all exports.	Exports forest products.			Percentage forest products of whole.
		Unmanufactured.	Manufactured.	Total.	
1882.....	783,239,732	18,595,472	5,413,556	24,009,028	3.02
1883.....	804,223,632	21,249,858	5,543,850	26,793,708	3.03
1884.....	724,964,852	18,925,406	5,349,720	24,275,128	3.03
1885.....	726,682,946	16,883,827	4,780,466	21,664,292	3.00
1886.....	665,964,529	15,934,547	4,708,843	20,643,390	3.01
1887.....	703,022,923	15,025,879	4,629,055	19,654,934	2.06
1888.....	683,862,104	17,806,981	5,256,127	23,063,108	3.05
1889.....	730,282,609	20,760,391	6,150,281	26,910,672	3.07
1890.....	845,293,828	21,764,868	6,509,645	28,274,513	3.03
1891.....	872,370,283	20,282,718	5,987,322	26,270,040	3.00
1892.....	1,015,732,011	19,476,876	6,062,789	25,539,665	2.05
1893.....	831,030,785	20,607,534	6,058,896	26,666,430	3.02
1894.....	869,204,837	20,938,445	6,773,724	27,712,169	3.02
1895.....	793,392,599	20,866,100	6,249,807	27,115,907	3.04
1896.....	863,200,487	24,520,633	7,226,475	31,747,108	3.07
1897.....	1,032,007,603	31,032,384	8,592,418	39,624,800	3.08
1898.....	1,210,291,913	28,415,033	9,098,219	37,513,252	3.01
1899.....	1,203,931,222	31,774,241	9,715,285	41,489,526	3.04
1900.....	1,370,763,571	39,365,578	11,232,839	50,598,417	3.05
1901.....	1,460,462,806	41,345,942	11,099,643	52,445,585	3.06
1902.....	1,355,481,861	36,162,158	11,617,690	47,779,848	3.05
1903.....	1,392,231,302	44,672,284	13,071,251	57,743,535	4.01
1904.....	1,435,179,017	52,447,305	12,981,112	65,428,417	4.05
1905.....	1,491,744,695	45,439,347	12,560,935	58,000,282	3.09

* Preliminary figures.

While it is true that during the early years of the Government the export trade of the United States passed through many adverse conditions and survived many accidents which threatened to overwhelm it—the French wars practically closing the ports of the civilized world to American shipping, and the disaster being aggravated by the domestic embargo—peace finally came, and with peace the United States took her place among the other producing world nations.

A perusal of the above table will show how consistently the exports of forest products kept increasing with the growth of other domestic exportations during the last eighty-eight years. For example, in 1818 the value of forest products exported was \$2,890,425, which was 3.09 percent of the total of all exportations. Forty-three years later, or in 1861, there were wood products exported to the value of \$7,882,933 or 3.08 percent of the whole; add another forty-four years, bringing the comparison down to 1905, and it will be found that \$58,000,282 worth of forest products were exported in that year, and this amount was 3.09 percent of the whole exportation of domestic products. The highest percentage point obtained in 1865, the last year of the Civil War, when 13 percent was reached. This was at the expense of other exports—cotton being the heaviest loser.

The classification of timber exportations has been changed many

times since the inception of statistical compilation by the Government. All timber exportations were classed as hewn from 1821 to 1868 and the quantities were given in tons; from 1869 to 1883, inclusive, it was classed as "hewn and sawed," and the quantities were given in cubic feet. In 1884, however, timber was divided into two classes—hewn and sawed—hewn being given in cubic feet and sawed in thousands of feet. It will be seen that the exportations of sawed timber have grown to be ten times greater than those of hewn. This was a natural evolution, for with the perfecting of American machinery the foreign countries that had been importers of hewn timber from this country were convinced that it was to their interests to purchase the sawed article in preference to the hewn. The United States is still exporting enormous quantities of hewn timber, however, the United Kingdom and other European countries being the heaviest buyers. The following table shows exportations of timber from 1821 to 1905, inclusive:

EXPORTS OF TIMBER, 1821-1905.

Hewn.					Hewn.			Sawed.
Year.	Tons.	Year.	Tons.	Year.	Tons.	Year.	Cubic feet.	M feet.
1821.....	15,220	1843.....	1,230	1865.....	4,133	1884.....	10,615,065	201,257
1822.....	10,487	1844.....	4,700	1866.....	19,975	1885.....	8,411,066	153,248
1823.....	3,756	1845.....	4,590	1867.....	51,467	1886.....	5,077,612	193,344
1824.....	7,166	1846.....	6,779	1868.....	75,720	1887.....	4,260,639	167,609
1825.....	18,176	1847.....	9,714	Hewn and Sawed.		1888.....	5,813,175	187,780
1826.....	7,515	1848.....	21,033			1889.....	6,301,065	252,996
1827.....	5,940	1849.....	9,979	Year.	Cubic feet.	1890.....	8,732,761	270,984
1828.....	4,523	1850.....	20,287	1869.....	3,861,728	1891.....	6,900,073	214,612
1829.....	36,435	1851.....	13,372	1870.....	7,115,975	1892.....	6,736,446	235,550
1830.....	19,203	1852.....	24,409	1871.....	7,115,007	1893.....	7,836,921	214,198
1831.....	32,335	1853.....	45,564	1872.....	12,594,738	1894.....	4,082,709	237,630
1832.....	26,439	1854.....	41,964	1873.....	14,154,244	1895.....	6,039,539	297,693
1833.....	20,247	1855.....	52,377	1874.....	25,209,049	1896.....	5,616,176	332,934
1834.....	20,383	1856.....	34,260	1875.....	13,553,714	1897.....	6,406,824	391,291
1835.....	36,020	1857.....	68,265	1876.....	21,786,414	1898.....	5,489,717	331,575
1836.....	28,744	1858.....	41,474	1877.....	20,640,259	1899.....	4,796,658	406,448
1837.....	17,187	1859.....	48,849	1878.....	18,361,915	1900.....	4,416,741	473,542
1838.....	21,238	1860.....	32,376	1879.....	13,255,241	1901.....	4,624,698	533,920
1839.....	20,899	1861.....	8,821	1880.....	16,365,346	1902.....	5,388,439	412,750
1840.....	12,484	1862.....	4,391	1881.....	22,961,618	1903.....	3,291,498	530,659
1841.....	61,249	1863.....	394	1882.....	24,491,354	1904.....	3,788,740	558,690
1842.....	19,633	1864.....	6,742	1883.....	19,913,220	1905 ⁱ	3,856,623	486,411

¹ Preliminary figures.

Taking up the exportation of boards, planks, deals, joists and scantling: The West Indies have from the earliest years been large buyers of this product. In 1790 this country exported 46,747,000 feet of sawed lumber, of which 41,163,000 feet went to the West Indies. The following table shows a break in the continuity of exportations from 1800 to 1812. All records covering this period were burned by the British on the capture of Washington. The totals given, however, are vouched for by the Department of Commerce and Labor.

EXPORTS—BOARDS, PLANKS, DEALS, JOISTS AND SCANTLING, M FEET.

Year.	British Isles.	France	Germany.	Holland and Belgium.	Spain and Portugal.	British West Indies.	French West Indies.	Other West Indies.	British North America.	Africa.	Brasil.	Argentina.	Cuba.	Mexico.	Total all countries.
1790...	2,228	76	...	...	143	9,908	26,908	4,352	16	169	...	...	...	...	46,747
1791...	6,777	88	...	...	248	11,944	18,396	3,832	246	605	...	...	...	...	41,716
1792...	7,242	371	36	26	301	12,642	31,239	8,663	890	...	...	...	...	...	52,456
1793...	4	...	...	...	...	26	26	5	...	...	...	...	...	...	61
1794...	1,359	6	...	...	96	11,615	6,973	4,514	161	41	...	...	...	...	35,154
1795...	2,329	80	97	...	303	18,868	4,906	10,756	450	1,378	...	...	...	...	40,735
1796...	3,634	60	...	...	795	20,969	5,310	20,800	167	197	...	...	...	...	58,871
1797...	3,724	25	96	...	1,063	6,436	7,111	22,437	96	147	...	...	...	...	43,221
1798...	1,068	122	500	...	81	17,115	7,968	24,436	313	96	...	...	...	...	52,404
1799...	633	...	...	...	73	37,613	2,367	14,622	491	63	...	...	...	...	56,647
1800...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	68,825
1801...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	71,630
1802...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	80,877
1803...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	79,235
1804...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	185,000
1805...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	94,989
1806...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	85,948
1807...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	79,424
1808...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	25,845
1809...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	64,725
1810...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	85,340
1811...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	63,042
1812...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	56,645
1813...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	20,699
1814...	187	5	...	...	186	...	102	19,891	...	...	...	...	...	...	51,337
1815...	940	...	...	...	798	9,356	8,952	27,157	1,546	...	...	...	...	...	11,676
1816...	180	149	...	...	841	15,180	8,779	28,888	4,763	...	...	...	...	...	63,192
1817...	25	69	...	...	190	23,907	15,577	35,888	7,204	...	...	...	...	...	86,576
1818...	18	13	...	...	64	20,177	12,906	39,284	14,179	117	...	...	...	...	91,788
1819...	18	10	...	...	5	6,302	10,748	37,905	33,837	20	...	...	...	...	92,850
1820...	45	5	...	...	8	7,838	10,245	45,172	23,112	...	...	...	...	...	89,420
1821...	477	...	...	...	22	3,600	11,555	19,219	13,846	...	...	...	...	...	76,244
1822...	16	...	...	...	84	12,613	13,961	15,959	935	275	490	...	...	...	88,490
1823...	189	6	...	...	...	12,668	8,869	16,379	1,108	166	622	...	...	...	64,690
1824...	245	61	...	...	...	17,448	9,654	17,246	4,476	213	217	...	...	...	77,923
1825...	...	...	...	...	...	20,766	13,313	11,068	1,740	823	466	...	...	...	78,091
1826...	...	...	...	...	...	18,611	14,910	13,925	500	311	256	...	...	...	76,845
1827...	85	153	...	...	96	6,907	20,564	17,682	1,388	592	944	...	...	...	82,008

1 Estimated.

EXPORTS—BOARDS, PLANKS, DEALS, JOISTS AND SCANTLING, M FEET—Continued.

Year.	British Isles.	France many.	Ger many.	Holland and Belgium.	Spain and Portugal.	British West Indies.	French West Indies.	Other West Indies.	British North America.	Africa.	Brazil.	Argentina.	Cuba.	Mexico.	Total all countries.
1928...	194	75	2	5	35	917	26,048	21,298	1,898	368	1,517	.....	28,828	610	86,981
1929...	174	118	.....	8	2	.....	23,260	15,743	434	317	1,431	.....	30,255	830	75,297
1930...	65	.....	88	24	49	.....	16,745	11,015	816	411	864	.....	31,210	318	67,300
1931...	216	75	.....	5	25	3,689	12,312	13,001	988	90	1,063	1,169	25,709	1,160	65,045
1932...	40	112	19	.....	196	9,083	9,335	14,644	1,347	410	683	1,053	26,796	2,251	67,930
1933...	234	196	.....	170	13	11,969	9,335	14,506	3,607	270	1,725	1,062	30,658	1,264	76,755
1934...	244	575	.....	.....	10	6,190	10,505	16,468	1,064	280	1,649	974	29,305	857	69,996
1935...	87	444	7	.....	181	7,896	88,827	16,378	3,319	263	2,200	2,376	28,553	90	153,871
1936...	135	307	4	3	43	8,715	9,564	15,063	2,368	481	1,381	1,381	32,949	1,060	76,950
1937...	120	502	7	.....	3	12,038	10,394	12,119	504	478	840	1,314	36,492	1,427	87,217
1938...	148	656	.....	.....	70	11,628	10,294	14,917	2,268	731	2,002	1,747	33,977	262	88,721
1939...	139	.....	181	8	38	11,768	9,773	14,917	2,747	1,233	2,190	1,888	33,977	147	84,630
1940...	148	82	5	2	265	10,426	13,713	15,988	2,747	263	1,129	1,311	31,440	338	83,075
1941...	60	74	17	25	194	9,530	8,997	15,239	4,893	453	1,678	3,057	41,704	939	93,049
1942...	184	237	54	.....	164	7,898	14,188	93,750	4,439	760	2,721	2,183	27,397	414	162,639
1943...	8	214	12	.....	111	7,087	10,167	6,813	1,842	523	1,123	339	17,616	361	49,754
1944...	1,098	123	38	.....	20	20,057	18,494	11,726	3,446	1,369	1,645	922	25,640	376	92,179
1945...	958	61	18	.....	2	24,014	16,115	10,357	4,968	1,231	1,903	2,813	26,446	503	93,873
1946...	86	132	128	10	28	26,970	16,115	10,357	4,514	506	2,398	1,729	26,941	511	100,119
1947...	132	87	46	.....	191	32,147	8,368	11,984	4,514	1,445	841	628	27,233	90	90,481
1948...	328	210	172	.....	1,286	24,487	8,765	12,478	1,798	1,631	4,921	2,160	33,058	711	100,590
1949...	462	278	286	111	1,286	13,588	3,138	4,784	1,798	1,026	2,571	5,917	24,932	604	87,346
1950...	731	257	383	514	1,483	10,725	3,440	7,029	353	860	2,571	9,997	24,611	426	74,743
1951...	317	730	613	440	3,520	9,250	3,997	10,387	1,106	1,251	2,214	4,482	54,491	704	100,804
1952...	223	460	958	416	2,482	11,722	7,732	12,417	1,583	1,468	964	7,517	35,156	725	100,895
1953...	538	496	481	494	959	4,775	3,407	9,116	1,583	1,417	2,569	4,373	28,700	535	78,599
1954...	918	596	276	.....	1,069	107,482	5,028	9,019	2,436	1,417	2,901	4,526	36,901	458	197,154
1955...	1,507	8,133	860	674	2,080	15,944	8,212	11,523	2,298	2,019	2,901	4,526	36,901	1,440	144,718
1956...	2,080	3,456	553	.....	3,189	10,416	6,495	11,523	4,414	1,834	9,308	8,902	31,834	1,332	126,330
1957...	7,608	3,025	1,439	623	3,654	32,668	16,321	21,298	7,418	2,117	5,185	12,976	68,408	2,617	309,165
1958...	2,967	2,151	1,125	499	3,451	15,061	10,844	14,908	88,435	2,751	5,673	11,292	64,749	2,013	217,861
1959...	7,014	59	897	592	1,969	13,876	9,933	12,734	29,625	1,758	17,485	15,157	62,863	1,879	197,099
1960...	14,375	667	672	247	3,692	12,890	5,256	12,105	6,132	4,870	9,746	15,157	55,083	1,932	170,923
1961...	18,779	1,114	.....	.....	2,023	11,018	4,479	8,892	2,444	3,407	9,746	15,157	32,971	919	132,323
1962...	14,925	1,665	.....	.....	548	7,780	2,382	7,275	1,873	3,235	4,935	15,157	26,059	1,255	129,243
1963...	21,168	25	125	255	291	5,090	2,049	6,610	7,481	2,239	1,774	22,154	26,550	3,917	135,901
1964...	10,908	844	294	433	243	6,700	1,326	8,944	6,017	1,876	2,675	22,154	32,904	7,161	132,298
1965...	15,548	242	.....	1,014	345	5,471	2,164	15,390	5,061	2,730	3,202	15,158	31,203	6,480	158,774
1966...	6,071	131	1,909	336	1,537	6,767	875	11,424	4,665	1,860	1,096	8,740	31,832	2,591	120,013

EXPORTS—BOARDS, PLANKS, DEALS, JOISTS AND SCANTLING, M. FEET—Continued.

Year.	British Isles.	France	Germany.	Holland and Belgium.	Spain and Portugal.	British West Indies.	French West Indies.	Other West Indies.	British North America.	Africa.	Brazil.	Argentina.	Cuba.	Mexico.	Total all countries.
1867...	6,351	497	23	50	3,864	13,334	1,684	12,703	2,372	1,834	4,307	11,907	31,336	2,625	130,666
1868...	5,668	202	53	834	1,268	6,063	1,480	10,962	6,401	1,567	2,430	13,828	39,916	2,923	131,973
1869...	5,406	341	143	243	1,112	8,469	2,326	7,875	3,231	1,983	2,395	18,149	20,869	1,973	134,370
1870...	6,174	1,897	83	38	424	10,039	1,514	9,575	5,188	638	5,454	7,043	23,260	3,020	140,863
1871...	6,985	253	...	69	702	10,374	3,118	14,581	3,240	798	4,020	2,737	35,715	10,687	154,830
1872...	13,126	309	246	404	1,826	10,002	4,326	15,451	4,432	1,416	7,826	12,683	27,053	3,415	176,872
1873...	17,187	369	551	412	932	10,875	5,706	15,140	8,218	1,168	9,112	12,683	33,666	3,046	236,557
1874...	33,845	949	964	2,754	2,084	15,854	6,112	15,347	8,305	2,694	15,097	12,683	27,624	5,881	238,481
1875...	42,191	1,288	1,430	867	5,936	13,243	2,838	19,312	12,394	45	15,097	7,447	30,987	6,407	213,974
1876...	71,089	3,760	912	2,920	15,042	15,477	3,603	17,303	14,432	3,172	12,162	5,766	31,302	5,766	232,407
1877...	94,950	6,883	4,690	6,861	13,896	12,734	5,154	19,360	26,596	3,027	15,440	4,733	33,089	3,214	321,530
1878...	70,667	13,486	4,734	13,438	14,483	16,227	5,244	18,968	15,584	4,071	11,603	4,733	33,310	8,183	313,143
1879...	27,977	13,297	3,805	8,377	10,156	20,865	6,446	18,643	12,521	5,902	14,911	11,925	36,384	6,192	275,102
1880...	41,643	14,152	4,303	10,372	12,167	22,072	7,160	21,584	18,804	6,374	20,490	6,287	23,469	7,859	285,194
1881...	35,188	16,845	6,060	14,223	12,722	21,450	5,692	16,700	105,752	9,317	14,496	15,291	38,051	25,315	407,455
1882...	37,016	12,988	3,125	9,674	17,312	27,874	5,992	16,700	33,166	5,115	11,254	30,711	25,956	26,211	499,406
1883...	43,019	16,739	4,046	11,712	15,360	21,818	7,319	20,954	22,367	5,115	11,254	30,711	25,956	19,788	414,920
1884...	38,360	12,930	6,578	13,623	12,569	16,040	5,973	19,946	22,367	3,006	17,294	58,279	33,150	10,344	320,602
1885...	49,012	14,630	5,029	15,926	11,160	18,417	4,714	15,968	21,941	3,648	22,619	58,279	33,150	8,106	435,008
1886...	30,964	7,565	2,649	12,785	14,491	18,381	4,714	15,968	21,941	3,648	22,619	58,279	33,150	17,452	412,424
1887...	40,417	13,723	6,674	16,626	12,629	18,416	6,963	20,470	21,941	3,648	22,619	58,279	33,150	17,452	412,424
1888...	85,343	15,388	11,897	22,724	12,460	22,095	7,605	20,470	21,941	3,648	22,619	58,279	33,150	21,901	436,718
1889...	103,393	10,554	13,512	24,328	29,533	24,719	7,366	26,869	23,532	4,491	21,562	129,204	27,896	22,942	571,075
1890...	85,856	18,827	10,753	23,228	18,375	31,378	12,258	26,869	27,885	7,721	25,198	86,233	35,008	26,289	612,814
1891...	105,681	20,230	16,584	37,390	14,289	23,903	13,703	26,869	24,862	8,506	46,298	28,241	46,303	57,959	624,730
1892...	101,304	22,984	13,604	41,095	13,450	23,798	9,163	28,791	28,420	10,717	38,473	20,984	57,763	41,717	608,727
1893...	89,957	25,951	17,490	43,947	10,131	23,903	14,428	34,190	22,341	13,634	42,908	55,549	83,140	41,512	642,530
1894...	83,574	18,523	15,852	39,976	13,917	29,858	7,611	32,793	25,188	16,124	27,168	49,033	65,291	29,945	687,332
1895...	79,060	22,284	15,859	47,492	12,404	27,917	4,514	26,934	38,113	61,920	62,162	72,199	28,548	33,441	616,235
1896...	124,876	26,080	37,805	75,509	19,778	32,438	7,915	29,021	62,643	81,774	63,877	91,186	27,451	76,627	720,214
1897...	143,814	19,763	28,154	75,509	19,778	32,438	7,915	29,021	62,643	81,774	63,877	91,186	27,451	76,627	720,214
1898...	120,314	29,580	52,638	118,338	13,013	31,342	7,266	13,720	104,565	22,860	44,759	59,037	64,450	73,779	1,004,464
1899...	143,208	37,714	53,105	123,003	33,287	25,629	9,989	21,679	86,317	22,860	44,759	59,037	64,450	73,779	1,004,464
1900...	192,000	41,679	74,009	182,148	24,704	22,425	9,170	16,858	86,317	22,860	44,759	59,037	64,450	73,779	1,004,464
1901...	161,014	26,378	37,692	94,184	19,241	20,601	5,448	12,557	87,792	22,860	44,759	59,037	64,450	73,779	1,004,464
1902...	186,928	21,319	52,015	121,611	20,870	22,959	6,038	12,749	122,539	22,860	44,759	59,037	64,450	73,779	1,004,464
1903...	215,462	33,904	77,336	143,203	29,602	24,753	5,934	6,023	176,093	44,759	59,037	59,037	64,450	73,779	1,004,464
1904...	154,757	35,120	60,398	116,734	...	...	...	...	159,379	46,350	31,278	143,637	113,174	115,383	1,353,924

1 Preliminary figures.

EXPORTS OF BOARDS, DEALS, PLANKS, JOISTS AND SCANTLING TO CERTAIN COUNTRIES OMITTED FROM PRECEDING TABLE—M FEET.

YEAR.	Peru.	Uruguay.	Hawaiian Islands.	Chile.	British Australasia.	China.	Colombia.	Italy.
1871.....	19,420	14,475	.....	4,171	4,735	4,378	1,763	63
1872.....	33,190	17,717	.....	7,637	5,738	3,614	1,649	57
1873.....	25,259	36,640	.....	12,611	5,385	331	1,869	70
1874.....	15,212	24,416	.....	10,284	13,275	5,456	3,249	365
1875.....	5,412	13,853	.....	7,859	2,122	143	2,460	487
1876.....	10,506	3,133	.....	4,917	7,202	18	1,874	685
1877.....	12,591	10,456	7,215	9,077	11,499	5	2,121	597
1878.....	11,410	11,024	11,081	11,883	15,872	394	2,090	2,878
1879.....	12,016	12,916	14,561	2,820	17,991	508	2,398	1,238
1880.....	2,188	10,443	13,644	3,635	14,118	1,006	2,828	3,500
1881.....	353	19,101	19,675	4,397	9,425	638	4,056	3,303
1882.....	3,570	25,980	22,123	8,067	22,390	2,207	12,953	3,029
1883.....	5,952	17,556	23,226	22,851	29,829	7,023	13,465	3,414
1884.....	7,597	17,480	22,512	13,348	38,441	983	21,887	5,799
1885.....	3,324	31,893	15,077	13,118	44,024	1,738	40,850	3,650
1886.....	4,105	14,818	16,935	15,934	71,879	1,830	19,360	9,717
1887.....	4,492	23,843	16,669	19,927	52,142	4,887	26,278	10,363
1888.....	3,785	18,575	12,218	12,539	52,174	.....	15,139	13,010
1889.....	5,837	26,123	12,528	26,158	65,663	2,325	8,160	10,390
1890.....	8,832	41,117	19,065	28,320	57,995	2,309	1,136	15,586
1891.....	9,233	6,753	30,007	17,019	74,311	5,269	3,252	9,338
1892.....	10,144	4,172	8,702	25,331	55,193	4,491	3,617	8,740
1893.....	8,411	5,114	8,703	28,820	30,725	4,925	6,765	10,405
1894.....	4,236	9,796	13,747	12,806	19,309	2,651	2,822	6,721
1895.....	4,760	10,967	18,616	34,055	41,118	7,646	4,829	12,452
1896.....	11,879	13,006	21,441	21,810	51,567	15,111	3,717	10,937
1897.....	15,117	16,375	24,400	14,796	64,884	7,371	4,363	9,994
1898.....	14,204	8,604	33,030	7,215	41,242	17,256	4,355	14,615
1899.....	9,777	12,250	48,028	7,861	47,600	15,487	3,782	16,617
1900.....	2,497	17,707	97,384	11,732	44,222	15,877	4,738	11,560
1901.....	18,743	13,504	.....	.....	85,011	9,683	3,552	.....
1902.....	21,696	17,917	.....	21,958	61,555	21,790	3,467	16,814
1903.....	16,356	11,850	28,263	32,208	69,414	21,871	2,996	12,997
1904.....	26,749	20,336	19,273	33,799	104,155	22,726	4,103	21,064
1905 ¹.....	.....	.....	16,933	31,278	68,248	38,698	2,272	23,653

¹ Preliminary figures.

The exportation of shingles by the United States has always been large. As early as 1790 it exported 67,331,000 shingles, of which 25,675,000 went to the British West Indies; 35,574,000 to the French West Indies, and 4,524,000 to the other West Indies. The highest point reached in the exportation of this commodity was in 1858, when it reached the enormous figures of 195,170,000. British North America was the highest individual importer in that year, buying 142,194,000; the British West Indies were next with 28,316,000 and the French West Indies third with 5,371,000. During the last six years, however, there has been a steady decrease in the exportation of this product. In 1900 there were 86,118,000 shingles exported; the next year, 1901, 39,255,000 were shipped, a drop of more than half. This was followed the next year by another drop of 6,000,000; the next year, 1903, saw an increase of 5,000,000—there being exported 38,211,000. In the two following years, 1904 and 1905, the exportation fell to 28,484,000 and 22,345,000, respectively.

The above decreases in exportation of shingles are accounted for by the

fact that the home consumption of this commodity has increased very materially in the last few years, together with an increased production in Canada. The following table shows shingle exportations by principal countries from 1790 to 1905, inclusive:

EXPORTS OF SHINGLES BY PRINCIPAL COUNTRIES AND TOTAL ALL COUNTRIES, 1790-1905—THOUSANDS.

Year.	British West Indies.	French West Indies.	Danish West Indies.	Cuba.	Porto Rico.	Other West Indies.	British North America.	Hawaiian Islands.	Total all countries.
1790.	25,075	35,574	812			4,524	285		67,231
1791.	33,067	33,054	786			3,831	43		74,206
1792.	30,712	31,583	904			6,128	155		71,638
1793.	29,432	38,934	1,688			10,615	126		80,813
1794.	12,996	3,922	3,407			7,317	144		27,650
1795.	20,642	3,038	6,243			7,998	164		35,939
1796.	24,251	5,032	6,348			11,435	25		47,307
1797.	11,806	13,167	11,047			14,744	22		51,805
1798.	18,659	12,008	4,306			15,769	67		60,915
1799.	42,238	2,840	6,349			6,782	10		58,510
1800.									76,028
1801.									81,044
1802.									82,110
1803.									75,926
1804.									75,156
1805.									74,854
1806.									82,146
1807.									76,890
1808.									17,512
1809.									34,047
1810.									43,122
1811.									69,097
1812.									90,327
1813.		530				9,750			10,750
1814.		419				3,659			4,196
1815.	6,560	5,596	1,204			11,286	518		25,419
1816.	21,970	21,406	9,061			23,663	2,233		78,919
1817.	27,308	26,282	6,071			24,892	3,336		88,413
1818.	25,109	21,170	2,304			16,004	1,372		66,342
1819.	14,918	18,022	4,588			15,732	6,313		61,652
1820.	22,237	13,004	4,812			19,666	7,380		68,647
1821.	4,193	15,810	5,241	3,751		17,468	4,568		53,583
1822.	3,903	17,615	2,940	4,341		18,219	4,061		52,183
1823.	15,447	5,532	2,241	2,457		12,810	293		40,848
1824.	14,239	7,408	4,014	2,202		8,977	195		38,129
1825.	16,513	10,242		2,830		9,486	562		40,959
1826.	26,442	17,412	8,944	4,588		11,552	185		71,991
1827.	5,201	12,761	3,866	2,648		8,707	1,158		37,696
1828.	674	17,155	14,942	3,482		12,574	1,065		51,672
1829.	100	21,354	9,731	13,869		14,000	1,886		62,459
1830.		14,981	5,842	6,205		9,544	2,528		41,175
1831.	8,572	6,665	4,548	3,237		6,420	1,213		28,122
1832.	15,469	3,156	4,786	2,939		9,075	738		38,123
1833.	13,912	5,420	3,817	4,794		9,054	1,177		40,956
1834.	7,325	9,754	6,110	3,203		9,315	505		37,917
1835.	5,892	8,379	4,014	1,447		15,362	1,142		39,288
1836.	13,730	6,087	6,923	3,946		9,900	1,004		43,604
1837.	13,386	7,225	5,510	2,671		8,302	2,367		42,108
1838.	8,292	6,435	4,770	4,367		7,479	1,574		38,007
1839.	7,916	6,954	5,410	3,158		8,049	1,855		37,569
1840.	6,459	6,525	3,734	1,749		8,522	2,129		31,359
1841.	9,096	6,880	4,587	2,199		8,163	2,065		37,739
1842.	9,214	8,674	2,030	1,777		8,280	934		34,000
1843.	7,917	5,594	1,556	1,043		2,800	89		20,270
1844.	19,459	9,290	2,185	1,676		5,717	161		42,615
1845.	33,964	8,573	4,029	3,495		6,305	431		60,918
1846.	20,992	7,164	3,043	1,225		5,913	687		42,098
1847.	18,085	5,511	3,279	1,812		6,285	529		38,147
1848.	19,852	4,042	1,740	1,506		7,955	775		39,743
1849.	14,802	2,716	2,888	1,052		3,444	530		30,277

EXPORTS OF SHINGLES BY PRINCIPAL COUNTRIES AND TOTAL ALL COUNTRIES.
1790-1906—THOUSANDS—Continued.

Year.	British West Indies.	French West Indies.	Danish West Indies.	Cuba.	Porto Rico.	Other West Indies.	British North America.	Hawai- ian Islands.	Total all coun- tries.
1850.....	11,872	5,975	2,363	1,169	.....	3,044	496	.....	32,779
1851.....	14,417	6,743	2,677	616	.....	4,972	536	.....	34,871
1852.....	20,596	8,930	6,072	737	.....	9,649	218	.....	53,405
1853.....	17,339	8,914	3,805	524	.....	5,931	622	.....	41,932
1854.....	8,396	3,879	2,241	591	.....	6,062	421	.....	26,174
1855.....	12,539	3,080	715	722	2,465	5,869	947	.....	36,825
1856.....	18,157	6,554	3,812	917	3,989	2,869	1,529	.....	45,173
1857.....	20,664	6,383	3,359	3,131	3,155	3,828	21,743	.....	70,646
1858.....	28,316	6,371	4,239	1,563	2,205	3,568	142,194	.....	195,170
1859.....	30,846	4,567	2,314	1,848	2,714	3,456	2,717	.....	57,815
1860.....	18,940	3,986	1,847	1,741	3,580	2,480	714	.....	41,601
1861.....	12,965	2,158	1,818	1,116	1,217	3,250	207	.....	30,078
1862.....	1,970	1,266	3,167	2,019	.....	1,933	381	.....	20,118
1863.....	3,389	2,633	4,084	1,197	.....	5,646	221	.....	30,708
1864.....	3,611	1,139	3,146	1,775	.....	9,495	322	.....	30,344
1865.....	2,122	615	5,771	1,403	1,716	6,093	1,116	.....	33,034
1866.....	2,332	5	3,720	260	1,224	4,127	305	.....	25,480
1867.....	2,959	60	3,237	275	2,451	4,575	1,250	.....	29,747
1868.....	7,037	508	4,640	341	2,197	3,338	1,185	.....	31,460
1869.....	5,800	1,276	3,476	100	2,640	1,003	118	.....	27,342
1870.....	5,619	1,076	1,605	502	2,164	3,217	192	.....	28,787
1871.....	3,404	1,244	2,644	556	1,562	5,073	56	4,849	33,254
1872.....	6,523	1,372	3,341	87	2,404	3,004	408	3,771	27,042
1873.....	6,389	1,296	3,364	33	1,827	3,731	5153	3,459	33,441
1874.....	4,174	826	1,258	154	634	3,590	4,364	4,316	28,311
1875.....	7,518	2,634	1,937	100	2,455	3,055	5,692	4,916	40,628
1876.....	9,512	588	1,463	228	2,058	4,385	2,243	4,662	33,636
1877.....	6,278	890	1,778	42	3,872	4,784	5,370	8,471	38,327
1878.....	11,357	1,917	2,975	236	2,842	3,984	1,948	12,536	46,518
1879.....	13,075	3,184	4,371	100	3,731	5,547	5,017	12,166	55,858
1880.....	6,447	4,141	2,206	85	4,538	1,176	7,447	12,065	54,311
1881.....	9,010	1,810	3,691	185	1,763	5,445	12,756	16,529	60,790
1882.....	8,126	1,247	1,905	181	1,357	2,405	15,856	15,539	61,065
1883.....	9,309	682	2,104	169	829	2,248	19,418	17,994	67,059
1884.....	7,976	2,539	2,387	243	2,857	2,162	10,934	17,032	61,962
1885.....	7,329	1,371	1,444	327	339	3,702	9,532	12,096	45,867
1886.....	6,000	2	2,441	60	975	1,996	10,819	12,415	42,072
1887.....	5,968	661	1,576	85	1,418	2,250	7,138	12,846	38,644
1888.....	8,969	916	1,188	3	365	1,927	94	10,743	33,932
1889.....	11,405	2,020	1,273	64	414	1,485	1,864	10,030	34,538
1890.....	11,464	1,139	810	150	429	2,833	2,626	9,759	36,627
1891.....	10,370	837	270	1,132	434	1,042	7,440	13,584	42,463
1892.....	6,889	1,286	242	712	376	496	115	13,011	31,198
1893.....	7,353	995	559	232	65	848	97	4,521	22,938
1894.....	10,832	1,184	375	109	893	1,076	264	6,029	28,277
1895.....	9,196	340	418	70	803	643	8,262	9,476	40,122
1896.....	8,698	645	.....	35	140	241	18,369	13,526	56,047
1897.....	9,073	132	101	32	609	537	25,874	13,836	58,508
1898.....	8,124	477	273	72	30	273	12,902	16,855	50,524
1899.....	8,221	943	180	312	140	64	24,721	27,787	73,791
1900.....	8,185	953	546	936	266	104	25,385	34,782	86,118
1901.....	6,169	220	285	504	543	259	17,849	.....	39,255
1902.....	7,208	55	50	1,460	434	145	11,712	.....	33,224
1903.....	2,490	62	284	821	581	81	19,781	20,092	38,211
1904.....	7,069	454	179	752	589	44	4,280	13,224	28,484
1905.....	.....	.....	.....	.....	.....	.....	.....	.....	22,345

1 Preliminary figures.

For many years manufactures of wood were classed under two divisions only—furniture and all other manufactures. It was not until 1864 that woodenware and hogsheads and barrels were segregated. Twenty years later, or in 1884, mouldings, trimmings and other house furnish-

ings, and doors, sash and blinds were separated in this classification, and in 1898 wood pulp was separately recorded.

Taking up the manufactures seriatim, the growth of the furniture trade with foreign countries was given on a preceding page. Wood-ware exportation shows a steady increase up to 1900 when it fell away somewhat, only to recover soon.

With the inception of the machine made door the United States was placed in a position to compete with the world in the sash and door trade, and how well it succeeded is shown in the subjoined table.

Mouldings, trimmings and other house finishings show a steady increase in value from 1884 down to the present time. The highest point reached was in 1905—\$616,331.

The trade in hogsheads and barrels is about holding its own. The United Kingdom, Belgium, Germany, Cuba and the West Indies are among the heaviest buyers.

The United States imports ten times as much wood pulp as it exports, but what is exported goes for the greater part to the United Kingdom, Canada, Belgium, France, Germany and Mexico.

The following compilation shows exportations of wood manufactures from 1811 to 1905:

CLASSIFIED STATEMENT OF WOOD MANUFACTURES EXPORTED FROM UNITED STATES, 1811-1905.

Year.	Furniture.	All other manufactures.	Total all manufactures.	Year.	Furniture.	All other manufactures.	Total all manufactures.
1811.....	\$ 148,758	\$ 190,635	\$ 339,393	1837.....	\$ 265,421	\$ 444,149	\$ 709,570
1812.....	43,248	109,335	152,583	1838.....	281,683	549,165	830,848
1813.....	2,230	61,137	63,367	1839.....	361,840	659,291	1,021,131
1814.....	2,526	49,462	51,988	1840.....	295,844	596,305	892,149
1815.....	52,278	150,660	202,938	1841.....	310,105	548,308	858,413
1816.....	114,847	199,635	314,482	1842.....	290,997	623,718	914,715
1817.....	100,743	202,372	303,115	1843 ¹	197,982	391,312	589,294
1818.....	99,134	193,274	292,408	1844.....	327,938	919,109	1,247,038
1819.....	125,383	174,276	299,659	1845.....	277,488	677,420	954,908
1820.....	159,704	148,481	308,185	1846.....	317,407	957,790	1,275,197
1821.....	179,436	169,715	349,251	1847.....	225,700	1,495,924	1,721,624
1822.....	292,959	197,883	490,842	1848.....	297,358	2,042,695	2,340,053
1823.....	196,599	191,801	388,400	1849.....	237,312	1,697,828	1,935,170
1824.....	276,458	207,028	483,481	1850.....	278,025	1,948,732	2,226,777
1825.....	248,182	176,840	425,022	1851.....	362,830	2,076,395	2,439,225
1826.....	321,022	216,710	537,732	1852.....	430,182	2,193,085	2,623,267
1827.....	306,486	213,815	520,301	1853.....	714,556	2,294,122	3,008,678
1828.....	311,616	258,686	570,302	1854.....	762,559	2,837,270	3,599,829
1829.....	224,109	217,829	442,028	1855.....	603,960	3,683,420	4,287,380
1830.....	239,463	172,772	412,235	1856.....	982,042	2,501,583	3,483,625
1831.....	229,231	275,219	504,450	1857.....	679,448	2,158,424	2,837,872
1832.....	169,038	312,078	481,116	1858.....	932,499	2,234,678	3,167,177
1833.....	200,635	315,491	516,126	1859.....	1,067,197	2,333,861	3,401,058
1834.....	177,309	319,131	496,440	1860.....	1,079,114	2,703,095	3,782,209
1835.....	294,790	417,532	712,322	1861.....	838,049	2,344,079	3,182,128
1836.....	244,046	421,016	665,062	1862.....	942,454	1,755,793	2,698,247

¹ Nine months ended June 30.

UNITED STATES—FOREIGN TRADE.

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CLASSIFIED STATEMENT OF WOOD MANUFACTURES EXPORTED FROM UNITED STATES, 1811-1905—Continued.

Year.	Furniture.	Wooden-ware.	Doors, sash and blinds.	Mouldings, trimmings and other house furnishings.	Hogs-heads and barrels.	Wood pulp.	All other manufactures.	Total all manufactures.
1863.	\$1,282,008						\$2,549,056	\$3,831,064
1864.	1,389,302	\$226,846	\$ 51,749		\$145,565		492,870	2,306,332
1865.	2,115,798	396,652	54,812		123,668		734,568	3,425,498
1866.	1,138,104				170,033		550,592	1,858,729
1867.	1,052,249				173,148		936,929	2,162,326
1868.	1,199,160				288,047		777,957	2,265,164
1869.	1,202,486	287,852					1,422,799	2,913,137
1870.	1,245,886	258,347			277,284		554,914	2,336,431
1871.	1,110,090				292,561		488,627	2,108,186
1872.	1,493,679	196,606			277,307		730,291	2,697,883
1873.	1,727,764	237,097			267,195		957,389	3,189,445
1874.	1,882,767	240,350			335,777		1,196,293	3,655,177
1875.	1,711,769	342,815			459,085		1,080,616	3,594,285
1876.	1,574,935	342,860			349,456		1,216,146	3,483,397
1877.	1,700,412	328,839			255,911		1,117,128	3,402,290
1878.	1,961,522	287,861			159,420		1,555,020	3,963,823
1879.	1,804,296	255,770			248,085		1,451,907	3,760,058
1880.	1,653,878	331,137			262,029		1,466,621	3,713,665
1881.	1,894,209	330,589			155,662		1,914,043	4,294,503
1882.	2,342,191	442,688			284,051		2,344,626	5,413,556
1883.	2,579,369	516,770			301,234		2,146,477	5,543,850
1884.	2,429,831	406,264	294,942	\$173,661	320,184		1,724,838	5,349,720
1885.	2,128,692	321,464	284,016	131,403	324,206		1,590,714	4,780,495
1886.	2,121,812	331,235	267,005	104,935	497,458		1,386,398	4,708,843
1887.	1,978,745	325,986	273,328	114,061	456,992		1,479,943	4,629,055
1888.	2,335,569	293,064	323,023	102,220	502,556		1,699,695	5,256,127
1889.	2,628,673	321,378	307,356	114,985	312,401		2,465,488	6,150,281
1890.	3,088,902	360,515	320,840	116,295	425,278		2,197,815	6,509,645
1891.	2,956,114	387,823	338,263	140,670	240,430		1,924,022	5,987,322
1892.	3,090,146	356,553	295,918	202,589	290,113		1,927,470	6,062,789
1893.	3,112,291	328,817	273,455	208,002	218,880		1,917,451	6,058,896
1894.	3,427,147	346,847	203,107	163,585	209,852		2,423,186	6,773,724
1895.	3,048,895	451,037	275,876	167,652	216,234		2,090,113	6,249,807
1896.	3,261,209	458,651	376,960	177,061	286,846		2,865,748	7,426,475
1897.	3,785,143	531,490	557,404	197,934	267,345		3,253,110	8,592,416
1898.	3,701,851	500,042	817,515	287,494	236,860	\$ 536,870	3,017,787	9,098,219
1899.	3,571,375	728,375	1,136,907	376,273	210,137	696,319	2,995,899	9,715,285
1900.	4,191,036	981,938	1,132,510	428,185	167,855	458,463	3,872,851	11,232,838
1901.	3,951,498	777,040	990,698	436,325	117,442	1,051,867	3,774,773	11,099,643
1902.	4,125,953	758,578	920,688	492,907	127,603	740,103	4,451,858	11,617,690
1903.	4,454,309	886,080	1,727,387	565,213	175,020	445,228	4,818,014	13,071,251
1904.	4,555,411	981,888	1,433,037	561,504	215,532	593,474	4,640,266	12,981,112
1905 ¹	4,439,944	782,138	853,350	616,331	188,996	473,585	5,206,591	12,560,935

¹ Preliminary figures.

IMPORTS OF FOREST PRODUCTS.

So far as the importation of forest products into the United States is concerned, it was never dictated by necessity, but was more in the nature of a luxury or convenience. For this country could from the beginning of its existence until now supply all the kinds of woods necessary for the manufacture of its articles of merchandise, with possibly one exception—dyewoods. The fancy cabinet woods imported were and are for the greater part mere substitutes for the less expensive or ornate, but as useful, domestic woods, and so must be classed as luxuries.

As the forests of the East became decimated, however, the eastern markets looked to the forests of Canada for considerable portions of their supplies; for it was found cheaper and more convenient to buy from

our neighbor across the border than to go into our inland forests for timber. This importation was made possible, aside from the coastwise traffic, by the opening of the canals connecting the St. Lawrence, and therefore the Ottawa River lumber districts, with the Hudson, via the Richelieu River and Lake Champlain.

The opening of the Erie Canal, in 1825, gave access to the forests of western New York and to the wonderful pine resources of Michigan as they developed; but through its Oswego feeder it furnished an inlet to the Canadian product tributary to Lake Ontario, and, in connection with the Rideau Canal, furnished a new route for Ottawa lumber. Furthermore, when Michigan in its turn began to show exhaustion, a way was open for an economical movement of lumber of Georgian Bay production to the eastern markets. The Erie Canal secured for New York the domination of the Atlantic seaboard and created or solidified the remarkable line of cities along its route. The lumber industry was one of those great lines of business which were built up and whose trend of trade was largely directed by those artificial waterways, and which, in turn, supplied and built up the eastern markets.

A presentment of the history of the reciprocity treaties with Canada by the United States, with their causes and effects, is given in chapter XXIX, on tariff legislation; therefore, it is not necessary to take the subject up here, as showing the part which it played in the growth of our commercial dealings in timber with that country. Suffice it to say that the development of this trade, while to a certain extent fostered by the favoring conditions of the reciprocity treaty of 1854 with Canada and by later concessions in the McKinley and Wilson tariff acts, was in the main due to the rapid growth of population in the eastern states coincident with the gradual diminution of their home sources of supply, rendering it necessary for them to look elsewhere for their lumber.

Entering into the history of our importations briefly, it will be found that the balance of trade stands indebted to the forests. For example, our exports of wood and its manufactures in 1824 were valued at \$2,218,067, but imports were valued at only \$27,093, in which amount cabinet woods valued at \$17,174 were included; fifty years later, or in 1874, our exports had reached the sum of \$21,353,721 and imports had increased to \$11,215,965; the value of forest products exported in 1904 was \$65,428,417, and of imports \$26,984,353. The following table shows the relation of importations of forest products to the grand total of all importations from 1824 to 1905:

IMPORTS OF FOREST PRODUCTS, VALUES AND RELATION TO TOTAL IMPORTS
1824-1905.

YEAR.	Total all imports.	Imports forest products.			Percentage forest products of whole.
		Unmanufactured.	Manufactured.	Total.	
1824.....	\$ 72,169,179	\$ 20,422	\$ 6,671	\$ 27,093	0.03
1825.....	90,189,310	213,376	75,474	288,850	0.32
1826.....	78,093,511	216,102	125,750	341,852	0.45
1827.....	71,332,938	393,445	98,318	491,761	0.69
1828.....	81,020,083	398,572	101,048	499,620	0.61
1829.....	67,088,915	314,240	120,881	435,121	0.64
1830.....	62,720,956	286,825	112,047	398,872	0.63
1831.....	95,865,179	332,111	147,750	479,861	0.50
1832.....	95,121,762	317,836	174,263	492,099	0.51
1833.....	101,047,943	275,636	154,506	430,242	0.42
1834.....	108,609,700	353,905	152,753	506,658	0.49
1835.....	136,764,295	433,855	213,213	647,068	0.49
1836.....	176,579,154	591,106	367,915	959,021	0.55
1837.....	130,472,803	650,060	317,302	967,362	0.75
1838.....	95,970,298	392,959	199,514	592,473	0.60
1839.....	156,496,956	504,826	338,682	843,508	0.53
1840.....	98,258,706	307,645	234,752	542,397	0.56
1841.....	122,957,544	499,719	225,244	724,963	0.59
1842.....	96,075,071	148,112	254,466	402,578	0.41
1843.....	42,433,464	21,522	61,279	82,801	0.19
1844.....	102,604,606	200,579	80,720	281,299	0.27
1845.....	113,184,322	299,082	170,092	475,174	0.42
1846.....	117,914,665	260,347	294,637	554,984	0.47
1847.....	122,424,349	332,069	224,516	556,585	0.45
1848.....	148,638,644	539,099	179,857	718,956	0.49
1849.....	141,206,199	552,633	250,739	803,372	0.56
1850.....	173,509,526	427,620	353,981	781,601	0.45
1851.....	210,771,429	675,130	403,102	1,078,232	0.51
1852.....	207,440,398	717,715	462,045	1,179,760	0.57
1853.....	263,777,265	875,384	478,813	1,354,197	0.50
1854.....	297,893,794	1,300,345	829,990	2,130,335	0.71
1855.....	257,808,708	1,196,464	876,435	2,072,899	0.80
1856.....	310,432,310	501,957	624,811	1,126,768	0.36
1857.....	348,428,342	589,481	639,544	1,219,025	0.35
1858.....	263,338,654	424,472	478,365	902,837	0.34
1859.....	331,333,341	525,020	438,751	963,771	0.29
1860.....	353,616,119	792,224	510,438	1,302,662	0.37
1861.....	289,310,542	424,424	390,170	814,594	0.28
1862.....	189,356,677	3,001,527	232,433	3,233,960	1.07
1863.....	243,835,815	348,250	332,537	680,787	0.27
1864.....	316,447,283	588,691	532,594	921,285	0.29
1865.....	298,745,580	629,918	190,048	819,966	0.34
1866.....	434,812,066	1,921,512	506,946	2,428,458	0.58
1867.....	395,781,096	7,045,815	756,962	7,802,777	1.09
1868.....	357,436,440	7,167,603	779,417	7,947,020	2.02
1869.....	417,506,379	.....	.....	8,938,890	2.01
1870.....	435,958,408	.....	.....	10,352,208	2.03
1871.....	520,223,684	8,813,751	1,149,389	9,963,140	1.09
1872.....	626,595,077	9,461,680	1,510,994	10,972,674	1.07
1873.....	642,136,210	12,171,853	1,494,803	13,666,656	2.01
1874.....	567,406,342	10,006,108	1,209,857	11,215,965	1.08
1875.....	593,005,436	6,997,008	1,081,565	8,078,573	1.05
1876.....	460,741,190	5,420,432	1,155,231	6,575,663	1.04
1877.....	451,323,126	4,684,849	798,175	5,482,824	1.02
1878.....	437,051,532	4,904,489	832,267	5,736,756	1.03
1879.....	445,777,775	5,333,277	924,464	6,257,741	2.01
1880.....	667,954,746	8,413,161	1,127,065	9,540,226	1.04
1881.....	642,664,028	10,281,836	1,384,190	11,665,826	1.08
1882.....	724,639,574	12,910,019	1,647,624	14,557,643	2.00
1883.....	723,180,914	13,167,108	1,600,470	14,867,578	2.00
1884.....	667,697,693	13,220,559	1,598,830	14,819,389	2.02
1885.....	577,527,329	11,276,427	1,593,978	12,870,405	2.02
1886.....	635,436,136	10,907,201	1,576,569	12,483,769	1.08
1887.....	692,319,768	11,425,330	2,174,423	13,599,753	1.09
1888.....	723,957,114	13,084,426	2,745,486	15,829,912	2.02

¹ Nine months ended June 30.² Of this item \$2,696,601 was lumber, timber and firewood from Canada.

IMPORTS OF FOREST PRODUCTS, VALUES AND RELATION TO TOTAL IMPORTS.
1824-1905—Continued.

YEAR.	Total all imports.	Imports forest products.			Percent- age forest products of whole.
		Unmanufac- tured.	Manufactured.	Total.	
1889.....	\$ 745,131,652	\$14,066,141	\$3,125,227	\$17,191,368	2.05
1890.....	789,310,409	13,561,788	3,680,128	17,241,916	2.01
1891.....	844,916,196	15,437,190	4,451,066	19,888,186	2.03
1892.....	827,402,462	15,288,578	4,557,860	19,846,438	2.04
1893.....	866,400,922	17,512,190	5,640,409	23,152,599	2.07
1894.....	854,994,622	14,347,420	3,806,653	18,154,073	2.08
1895.....	731,969,965	14,080,416	3,123,703	17,814,119	2.03
1896.....	779,724,674	17,048,557	3,519,410	20,567,967	2.06
1897.....	764,730,412	17,708,665	2,834,750	20,543,415	2.07
1898.....	616,049,654	11,541,390	2,320,553	13,861,943	2.02
1899.....	697,148,489	11,883,173	2,619,182	14,502,355	2.01
1900.....	849,941,184	15,837,342	4,754,566	20,591,908	2.04
1901.....	823,172,165	15,605,049	4,149,156	19,754,205	2.04
1902.....	903,320,948	19,620,812	4,824,787	24,445,599	2.07
1903.....	1,025,719,237	22,257,849	6,488,422	28,746,271	2.08
1904.....	991,087,371	20,489,432	6,494,921	26,984,353	2.07
1905 ¹	1,117,512,629	22,046,896	7,517,269	29,564,165	2.06

¹ Preliminary figures.

Taking up the different kinds of timber imports seriatim, it is thought advisable to place the cabinet woods first; especially as this is the only class that has any degree of continuity from the early years down to the present time. Most of this commodity comes from Haiti, San Domingo, Cuba, Porto Rico, Mexico, West Indies, Honduras and Central America.

Of all the woods in this category mahogany is of the greatest importance. For many years the bulk of this product was shipped across the ocean to the United Kingdom, there to be redistributed throughout the world. This still holds true of the African mahogany; but during the last decade numerous individuals and companies of the United States have entered upon the direct purchase of trees or forests in the West Indies, Central and South America and Africa, with the intent to broaden the field of production and to make direct importations. This fact intensifies the grip the United States is getting on the mahogany resources, in that it controls its own sources of supplies. The total mahogany import in 1900 was 28,228,000 feet; of which 6,320,000 came from the United Kingdom, 7,363,000 from Central America, 10,264,000 from Mexico and 2,815,000 from Cuba. In 1905, 31,844,000 feet were imported; 6,757,000 coming from the United Kingdom, 12,525,000 from Central America, 8,644,000 from Mexico and 1,467,000 from Cuba.

A statement of the imports of mahogany for six years ending with 1905, by principal countries, is here given:

UNITED STATES—FOREIGN TRADE.

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IMPORTS OF MAHOGANY, 1900-1905—FEET.

COUNTRIES.	1900.	1901.	1902.	1903.	1904.	1905.
United Kingdom.....	6,320,000	4,559,000	10,893,000	14,000,000	8,926,000	6,757,000
Central America.....	7,363,000	8,603,000	14,289,000	12,831,000	16,560,000	12,525,000
Mexico.....	10,264,000	12,477,000	11,724,000	12,064,000	16,723,000	8,644,000
Cuba.....	2,815,000	5,170,000	5,977,000	7,939,000	4,946,000	1,467,000
Other West Indies.....	520,000	502,000	1,219,000	753,000	1,785,000	61,000
South America.....	739,000	933,000	312,000	189,000	762,000	1,088,000
Other countries.....	207,000	37,000	359,000	611,000	687,000	1,272,000
Total all countries.....	28,228,000	32,281,000	44,773,000	48,387,000	50,370,000	31,844,000

The value of all cabinet woods—mahogany, lancewood, cedar, granadilla, ebony, rosewood, satinwood, etc.—imported into the United States from 1824 to 1905, by countries, is shown in the following table:

IMPORTS OF CABINET WOODS, BY PRINCIPAL COUNTRIES, 1824-1905.

Year.	British Isles.	British North America.	British West Indies and British Honduras.	Cuba and Porto Rico.	Brazil.	Mexico.	Haiti and San Domingo.	Central America.	Total all countries.
1824.....	\$ 56	\$	\$ 5,948	\$ 10	\$	\$ 9	\$ 4,362	\$ 6,002	\$ 17,174
1825.....	84	.....	2,799	14,798	19	4,864	128,402	27,659	218,045
1826.....	1,601	.....	5,689	8,652	50	324	.....	43,257	211,682
1827.....	810	.....	9,858	24,695	394	11,724	189,291	48,890	288,464
1828.....	.....	.....	189	84,202	3,428	40,210	222,163	82,559	390,161
1829.....	.....	.....	900	9,696	.....	18,220	228,782	8,465	306,670
1830.....	.....	.....	161	28,917	188	8,178	208,948	25,018	282,472
1831.....	42	.....	17,861	21,691	1,465	5,297	229,608	17,987	326,167
1832.....	1,163	.....	19,700	34,414	5,107	8,618	206,308	13,298	312,332
1833.....	642	.....	26,966	29,008	1,491	1,520	156,766	18,939	263,184
1834.....	984	.....	22,442	37,895	3,714	1,797	206,184	14,978	320,378
1835.....	1,955	.....	26,747	51,555	2,716	5,828	276,854	18,894	428,611
1836.....	755	.....	63,156	106,941	8,559	2,560	282,040	35,130	539,679
1837.....	.....	.....	45,576	124,730	7,428	1,117	366,068	15,062	605,187
1838.....	840	.....	56,620	42,288	520	865	196,697	24,585	344,415
1839.....	7,504	.....	39,476	48,822	492	2,638	296,815	5,313	469,332
1840.....	5,840	.....	30,721	49,361	2,378	1,517	168,209	7,482	284,361
1841.....	4,749	.....	37,217	54,408	2,393	6,620	296,861	16,818	464,646
1842.....	2,569	.....	914	35,485	10	478	19,964	2,798	98,638
1843.....	1,180	.....	1,845	1,821	75	850	389	297	21,007
1844.....	.....	.....	26,578	49,561	5,370	228	105,841	3,734	198,679
1845.....	.....	.....	29,980	95,033	80,149	286	126,526	3,927	298,697
1846.....	6,320	.....	18,461	95,356	26,287	1,354	101,709	8,184	258,999
1847.....	19,207	.....	34,476	42,580	4,562	1,253	76,296	2,142	257,586
1848.....	10,998	.....	82,187	115,861	45,650	3,169	128,365	6,853	396,349
1849.....	993	.....	21,172	107,862	43,130	9,237	112,647	4,497	464,943
1850.....	154	.....	18,835	80,273	55,918	3,968	70,246	4,106	343,578
1851.....	30,271	4,320	37,235	97,580	118,968	1,431	127,607	1,688	428,361
1852.....	15,310	5,701	72,118	118,879	98,278	4,506	106,325	15,800	435,568
1853.....	8,274	10,956	67,017	138,809	118,980	5,468	106,322	.....	462,818
1854.....	18,366	13,707	87,506	206,562	150,897	24,778	162,021	8,508	637,624
1855.....	11,967	1,417	61,076	137,169	158,391	56,074	118,791	5,974	604,240
1856.....	1,205	.....	59,045	118,365	80,999	58,643	97,531	6,027	476,800
1857.....	873	78	36,236	108,847	154,346	43,813	137,652	360	560,024
1858.....	637	191	34,582	117,914	81,242	43,659	84,108	397	419,415
1859.....	5,439	15	36,416	89,119	135,899	55,911	122,687	4,594	524,271
1860.....	5,551	2,058	59,345	133,527	230,907	101,371	116,316	4,624	698,390
1861.....	644	21	22,840	69,400	133,747	99,897	52,696	116	420,679
1862.....	1,066	1,504	27,710	85,281	.....	51,415	98,823	1,733	296,988
1863.....	2,276	763	17,031	80,208	95,854	68,754	67,580	1,066	345,645
1864.....	36,797	8,058	17,971	200,269	166,982	62,342	55,845	1,456	581,060
1865.....	7,704	2,012	32,421	208,013	142,649	33,921	45,833	8,041	553,298
1866.....	53,477	2,599	90,146	160,630	113,605	32,880	72,738	10,467	642,915
1867.....	26,992	12,008	35,178	211,376	88,115	106,900	61,604	10,998	605,131

IMPORTS OF CABINET WOODS, BY PRINCIPAL COUNTRIES, 1824-1905.—Continued.

Year.	British Isles.	British North America.	British West Indies and British Honduras.	Cuba and Porto Rico.	Brazil.	Mexico.	Haiti and San Domingo.	Central America.	Total all countries.
1868.....	23,838	2,333	27,108	117,170	92,584	72,824	50,654	8,811	435,271
1869.....	38,562	39,411	13,346	138,404	219,302	126,345	35,868	16,747	698,381
1870.....	39,006	27,874	14,655	62,524	190,553	107,808	75,638	21,662	670,131
1871.....	68,352	23,897	18,654	54,573	238,493	172,785	81,896	14,965	909,330
1872.....	94,091	279,356	31,195	47,306	259,732	278,950	74,100	16,932	1,325,415
1873.....	129,837	946,146	17,723	50,283	197,649	171,554	143,980	19,970	1,877,633
1874.....	112,532	1,087,669	35,609	70,095	189,246	324,520	66,102	37,061	2,262,441
1875.....	142,521	867,523	16,629	26,671	142,269	346,923	60,500	71,551	1,896,585
1876.....	115,279	614,575	29,179	4,365	194,959	247,833	60,067	18,066	1,406,031
1877.....	88,011	655,216	8,153	9,804	75,988	133,690	53,680	35,001	1,237,513
1878.....	115,162	630,437	9,117	6,397	88,061	257,853	85,863	13,968	1,429,096
1879.....	229,161	771,126	13,110	42,364	104,524	224,925	41,493	26,924	1,758,632
1880.....	177,522	1,016,937	46,118	245,777	223,276	408,754	46,406	40,327	2,894,579
1881.....	209,443	.....	26,967	244,538	258,563	329,295	71,105	56,196	1,530,534
1882.....	150,649	.....	61,091	349,591	237,457	499,776	57,559	27,802	1,673,167
1883.....	110,102	.....	23,952	425,048	317,945	441,083	102,515	61,288	1,881,789
1884.....	155,480	.....	50,626	512,171	187,325	742,450	62,187	53,529	1,734,015
1885.....	246,662	.....	32,391	553,225	49,464	459,702	19,587	131,255	1,658,414
1886.....	169,727	.....	23,578	578,416	63,145	315,929	87,340	50,160	1,438,351
1887.....	143,066	.....	23,920	436,553	55,815	438,153	91,692	27,234	1,421,134
1888.....	108,310	.....	24,192	388,724	36,204	537,000	60,388	19,593	1,416,742
1889.....	154,281	.....	33,758	419,768	63,825	301,142	4,955	55,392	1,512,372
1890.....	167,789	.....	20,668	516,489	35,327	405,322	16,125	63,616	1,527,131
1891.....	182,605	.....	26,437	581,566	47,452	436,456	70,766	139,263	1,799,316
1892.....	251,748	.....	13,695	525,688	90,393	698,666	103,114	251,716	2,182,803
1893.....	341,595	.....	13,363	1,072,185	101,916	626,359	59,773	245,688	2,662,636
1894.....	150,473	.....	12,500	681,350	17,809	360,490	60,819	198,258	1,635,278
1895.....	115,978	456	10,872	494,848	43,469	253,162	54,252	14,157	1,312,754
1896.....	137,018	10,228	1,740	524,212	15,614	769,726	40,022	139,615	1,838,655
1897.....	97,830	667	13,925	65,534	12,591	677,972	60,512	235,494	1,391,714
1898.....	200,547	569	3,791	17,920	12,276	857,066	69,306	265,482	1,732,231
1899.....	345,901	91	16,827	40,636	33,509	969,949	57,400	419,543	2,230,240
1900.....	449,330	618	17,678	381,050	22,633	809,919	85,770	418,965	2,163,301
1901.....	501,521	5,803	13,482	811,332	35,407	771,650	102,483	478,208	2,963,549
1902.....	910,713	10,793	20,226	679,057	16,749	567,353	90,375	807,680	3,861,275
1903.....	1,285,422	1,566	104,125	1,098,638	35,937	520,053	153,763	616,127	4,095,300
1904.....	953,749	.....	341,333	1,076,615	41,729	688,320	102,713	632,402	4,134,611
1905 ¹.....	.....	.....	.....	.....	.....	.....	.....	.....	3,055,617

¹ Preliminary figures.

An examination of the above table shows a remarkable increase in the imports of cabinet woods from British North America of from \$23,897 in 1871 to \$279,356 in 1872, and \$946,146 in 1873. This is accounted for in one way only, and that is that some other class must be included with cabinet woods from 1872 to 1880, inclusive—possibly "other unmanufactured," for cabinet woods are combined with "other unmanufactured" from 1881 to 1894, inclusive.

It might be well to mention here that dyewoods have been eliminated throughout, for the reason that they have been included in the chemical and not in the wood schedules.

Nearly all the importations of lumber are from British North America, a large portion of which is of the lower grades. The United States gets some good lumber from Canada, but the bulk of that product goes across the Atlantic. For a period of thirty-five years, beginning

with 1871 and ending 1905, it imported 10,573,919,000 feet of sawed lumber from Canada, against 15,929,000 from all other countries. The highest point reached in the importation of this commodity from that country was in 1897, the fiscal year preceding the adoption of the Dingley bill, when it amounted to 883,770,000 feet. The year following the restoration of the old duty of \$2 on lumber the imports of boards, deals, etc., dropped to 353,134,000 feet. The subjoined statement shows imports of sawed lumber from British North America from 1871 to 1905, inclusive, and from all other countries combined:

IMPORTS OF BOARDS AND OTHER SAWED LUMBER—FEET.

YEAR.	British North America.	All other countries.	YEAR.	British North America.	All other countries.
1871.....	725,784,000	210,000	1889.....	647,842,000	332,000
1872.....	714,671,000	60,000	1890.....	659,703,000	624,000
1873.....	818,250,000	52,000	1891.....	757,149,000	95,000
1874.....	562,237,000	158,000	1892.....	663,226,000	27,000
1875.....	393,768,000	18,000	1893.....	742,351,000	246,000
1876.....	333,990,000	6,000	1894.....	514,461,000	158,000
1877.....	316,261,000	10,000	1895.....	600,790,000	8,000
1878.....	327,281,000	17,000	1896.....	786,101,000	109,000
1879.....	355,294,000	10,000	1897.....	883,770,000	11,000
1880.....	515,315,000	28,000	1898.....	353,134,000	81,000
1881.....	575,210,000	110,000	1899.....	423,730,000	198,000
1882.....	612,343,000	21,000	1900.....	678,900,000	1,326,000
1883.....	575,044,000	55,000	1901.....	490,671,000	249,000
1884.....	600,714,000	48,000	1902.....	664,751,000	852,000
1885.....	555,325,000	257,000	1903.....	719,110,000	1,827,000
1886.....	547,504,000	328,000	1904.....	586,459,000	2,773,000
1887.....	558,963,000	273,000	1905 ¹	705,591,000	4,936,000
1888.....	608,326,000	417,000			

¹ Preliminary figures.

The following table shows quantities and values of total imports of boards, planks, deals, joists and scantling from 1871 to 1905, inclusive:

IMPORTS OF BOARDS, PLANKS, DEALS, JOISTS AND SCANTLING, 1871-1905.

Year.	Quantity, thousands.	Value.	Year.	Quantity, thousands.	Value.
1871.....	725,994	\$6,863,684	1889.....	648,174	\$7,823,721
1872.....	714,731	7,132,061	1890.....	680,327	7,786,093
1873.....	818,302	9,456,641	1891.....	757,244	8,412,842
1874.....	562,395	6,764,314	1892.....	663,253	7,543,229
1875.....	393,786	4,571,078	1893.....	742,597	8,239,370
1876.....	333,996	3,672,105	1894.....	514,619	6,136,961
1877.....	316,271	3,146,093	1895.....	600,798	6,859,532
1878.....	327,298	3,174,335	1896.....	786,209	8,605,634
1879.....	355,304	3,292,042	1897.....	883,781	9,075,981
1880.....	515,343	5,086,850	1898.....	353,215	3,508,818
1881.....	575,320	6,279,541	1899.....	423,928	4,200,168
1882.....	612,364	7,386,799	1900.....	660,226	7,475,309
1883.....	572,099	7,582,194	1901.....	490,820	6,361,423
1884.....	600,762	7,757,156	1902.....	665,603	9,271,090
1885.....	555,582	6,814,248	1903.....	720,937	10,073,317
1886.....	547,832	6,392,305	1904.....	589,232	8,878,474
1887.....	558,236	6,854,401	1905 ¹	710,527	10,906,661
1888.....	608,743	7,515,719			

¹ Preliminary figures.

Importations of all other lumber are shown in the subjoined table from 1871 to 1900. The greater portion of this product was received also from British North America. During the last five years there has been imported to this country miscellaneous lumber to the value of \$7,575,712, divided as follows: 1901, \$1,246,509; 1902, \$1,380,973; 1903, \$1,753,532, which was the highest point reached in the last thirty-five years; 1904, \$1,545,384, and 1905, \$1,649,314.

IMPORTS OF OTHER LUMBER—VALUES.

YEAR.	British North America.	All other countries.	YEAR.	British North America.	All other countries.
1871.....	\$ 402,387	\$ 2,072	1886.....	\$ 757,378	\$ 10,715
1872.....	268,633	1,452	1887.....	813,432	5,141
1873.....	397,855	1,777	1888.....	1,067,016	4,404
1874.....	476,724	92	1889.....	1,318,160	5,945
1875.....	219,529	378	1890.....	1,088,858	5,801
1876.....	224,793	90	1891.....	1,084,030	26,352
1877.....	224,504	175	1892.....	1,319,092	11,099
1878.....	198,329	1,687	1893.....	1,570,499	12,026
1879.....	182,365	1,862	1894.....	1,415,049	4,616
1880.....	301,519	12,504	1895.....	299,363	741
1881.....	449,432	25,911	1896.....	21,375	370
1882.....	762,885	8,358	1897.....	14,916	4,063
1883.....	706,839	10,921	1898.....	789,630	7,213
1884.....	790,738	16,637	1899.....	978,151	8,988
1885.....	688,531	16,280	1900.....	1,298,528	46,065

All shingle importations are from Canada, and they come for the most part from Quebec, Ontario and New Brunswick. The amount imported has fluctuated for thirty-three years, but the high water mark was reached in 1904 when 770,373,000 were received at a value of \$1,602,999. The following table shows quantities and values of shingle importations from 1872 to 1905, inclusive:

IMPORTS OF SHINGLES, 1872-1905.

Year.	Quantity, thousands.	Value.	Year.	Quantity, thousands.	Value.
1872.....	102,904	\$ 209,503	1889.....	214,546	\$ 461,841
1873.....	108,448	243,404	1890.....	194,168	414,347
1874.....	109,245	273,490	1891.....	260,652	553,285
1875.....	82,110	197,755	1892.....	363,027	732,191
1876.....	38,279	86,255	1893.....	459,044	916,829
1877.....	34,190	68,189	1894.....	378,632	732,284
1878.....	47,532	97,149	1895.....	51,513	99,790
1879.....	48,710	93,619	1896.....	1	.....
1880.....	59,402	117,347	1897.....	1	.....
1881.....	87,135	188,400	1898.....	435,421	760,994
1882.....	99,264	244,819	1899.....	471,594	827,886
1883.....	104,657	280,905	1900.....	541,040	1,011,234
1884.....	86,219	215,424	1901.....	555,853	1,028,184
1885.....	69,511	157,778	1902.....	707,614	1,362,821
1886.....	70,150	171,597	1903.....	724,131	1,494,906
1887.....	89,169	185,385	1904.....	770,373	1,602,999
1888.....	101,715	331,329	1905 ²	758,745	1,581,421

¹ Not separately enumerated for 1896-1897. ² Preliminary figures.

In the importations of unmanufactured wood from British North America from 1881 to 1894, inclusive, cabinet woods are included; after that date, however, cabinet woods were again kept separate as a class, and will be found under another caption. When the Dingley bill became effective the importations of unmanufactured wood dropped nearly two-thirds in value. The statement which follows shows imports of this commodity from British North America, compared with all other countries:

IMPORTS OF OTHER UNMANUFACTURED WOOD, 1881-1900.

YEAR.	British North America.	All other countries.	YEAR.	British North America.	All other countries.
1881.....	\$ 1,279,670	\$ 519,839	1891.....	\$ 2,357,238	\$ 1,131,210
1882.....	1,980,029	833,900	1892.....	2,109,767	1,263,573
1883.....	1,904,960	775,198	1893.....	3,053,709	989,431
1884.....	1,573,217	1,046,244	1894.....	3,794,041	581,175
1885.....	1,062,983	804,724	1895.....	3,955,245	1,023,993
1886.....	1,362,337	717,328	1896.....	3,445,862	709,690
1887.....	1,600,456	526,601	1897.....	3,650,440	1,051,625
1888.....	2,039,897	683,148	1898.....	1,484,158	820,608
1889.....	2,145,219	782,033	1899.....	1,157,038	818,977
1890.....	1,948,334	766,598	1900.....	1,394,653	1,256,145

It is somewhat remarkable that the United States imports large quantities of wood pulp from Europe. British North America is its chief foreign source of supply, however, for in 1905 it furnished 130,882 tons out of the total importations of 167,504 tons. Going back to 1891, the earliest year in which wood pulp statistics are shown, more of this product was received from Sweden and Norway than any other one country. This continued to be the case until 1895, when British North America took the lead and has since held it, gaining year by year. In value, importations of wood pulp are many times greater than exportations.

The following tables show quantities and values of importations from 1890 to 1905, inclusive, and quantities received from principal countries from 1891 to 1905, inclusive:

IMPORTS OF WOOD PULP, 1890-1905.

Year.	Quantity, tons.	Value.	Year.	Quantity, tons.	Value.
1890.....	43,478	\$1,814,356	1898.....	29,846	\$ 601,642
1891.....	43,316	1,902,689	1899.....	33,319	671,506
1892.....	41,118	1,820,143	1900.....	82,441	2,405,630
1893.....	68,565	2,908,884	1901.....	46,757	1,586,402
1894.....	36,587	1,664,547	1902.....	67,416	2,056,092
1895.....	28,440	958,009	1903.....	116,881	3,387,770
1896.....	46,143	1,052,829	1904.....	144,796	3,602,668
1897.....	41,770	800,886	1905 ¹	167,504	4,500,955

¹ Preliminary figures.

LUMBER INDUSTRY OF AMERICA.

IMPORTS OF WOOD PULP FROM PRINCIPAL COUNTRIES, 1891-1900—TONS.

COUNTRIES.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Austria-Hungary..	2,218	1,754	3,753	2,129	1,792	424	150	10	.....	1,030
Belgium.....	108	157	20	90	125	105	.....	80	.....	96
British North America.....	9,424	11,158	12,051	9,417	11,716	22,797	28,890	20,327	23,653	40,312
Germany.....	10,359	11,888	21,124	8,942	5,984	6,195	1,783	1,617	713	5,785
Netherlands.....	30	.....	86	50	170	.....	14	.....	14	262
Sweden & Norway.....	15,102	14,655	22,551	13,866	7,136	7,839	5,019	3,704	4,192	15,140
United Kingdom...	1,672	592	1,099	499	304	1,383	.....	215	265	545

IMPORTS OF WOOD PULP, 1901-1905—TONS.

COUNTRIES.	1901.	1902.	1903.	1904.	1905. ¹
British North America.....	36,845	51,162	81,965	101,415	130,892
Germany.....	2,823	5,533	13,783	9,104	6,994
Other Europe.....	7,089	10,631	21,113	34,277	29,628

¹ Preliminary figures.

It is unfortunate, from an historical viewpoint, that the statistics of importations of logs and round timber and sawn and hewn timber were not kept separate until recent years, and it is owing to this oversight on the part of the government officials that it is impossible to go back earlier than 1895 with a view of showing the quantities and values of the importations of this valuable product. While this is regretted, the following tables will show the effect the Dingley bill had on these commodities:

IMPORTS OF LOGS AND ROUND TIMBER, 1895-1905.

YEAR.	Quantity, M feet.	Value.	YEAR.	Quantity, M feet.	Value.
1895.....	153,056	\$1,149,764	1901.....	82,985	\$ 804,188
1896.....	315,469	2,564,438	1902.....	106,171	907,168
1897.....	333,727	2,616,397	1903.....	73,636	637,881
1898.....	275,547	2,430,089	1904.....	66,033	552,504
1899.....	199,195	1,766,294	1905 ¹	97,302	732,633
1900.....	101,397	879,956			

¹ Preliminary figures.

IMPORTS—TIMBER, SAWN AND HEWN—SQUARED OR SIDED, 1895-1905.

YEAR.	Quantity, cubic feet.	Value.	YEAR.	Quantity, cubic feet.	Value.
1895.....	5,048	\$ 56,783	1901.....	112,653	\$ 18,819
1896.....	8,010	82,022	1902.....	129,183	18,027
1897.....	4,743	93,777	1903.....	207,554	41,131
1898.....	138,788	39,543	1904.....	139,180	33,357
1899.....	133,792	18,068	1905 ¹	184,742	23,912
1900.....	564,789	46,550			

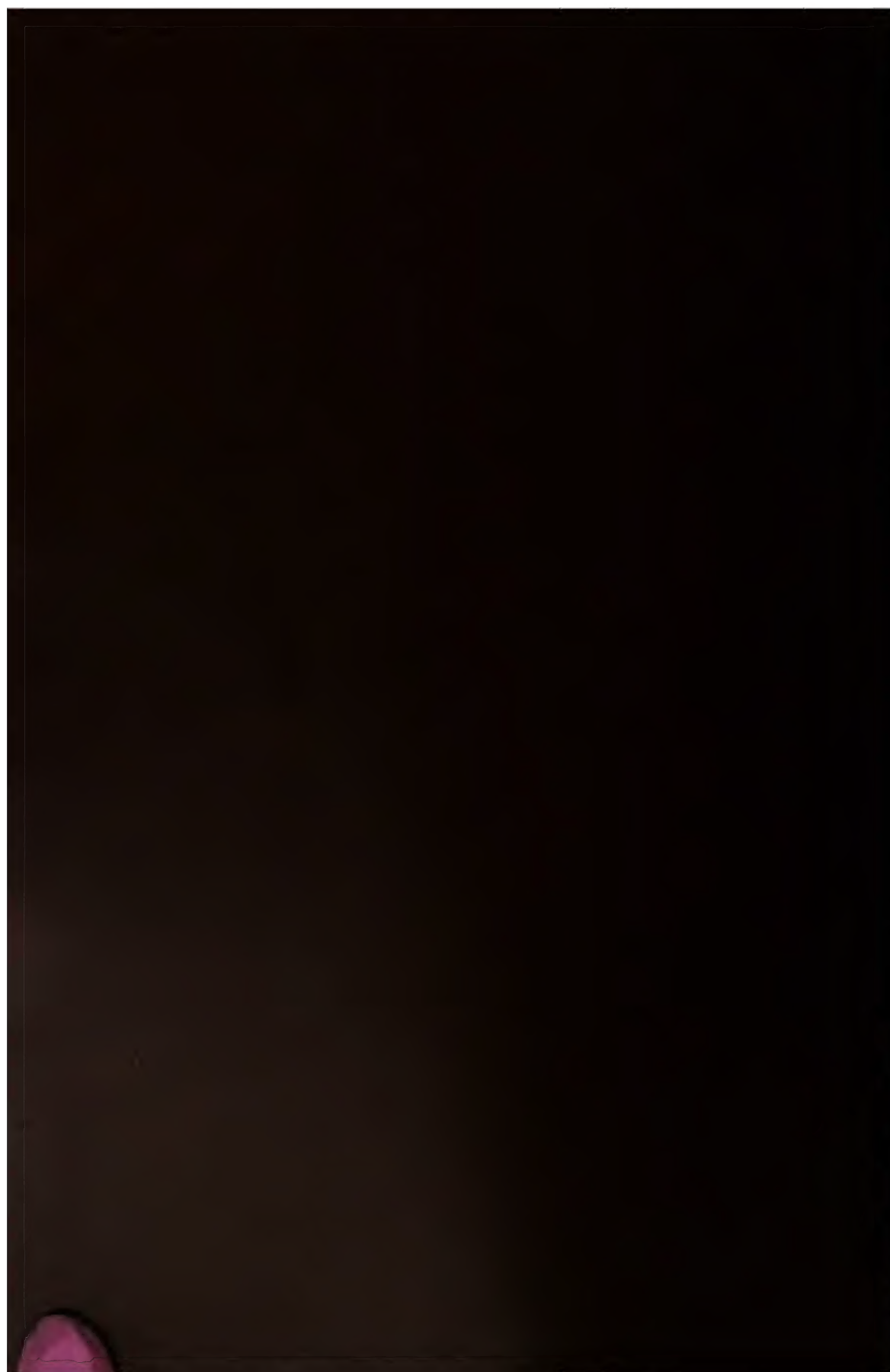
¹ Preliminary figures.

Taking up the importations of cabinet ware and other manufactures of wood, it will be found that the value of this commodity has grown with the development of the country. During the first three years of the last five there was a steady increase in the importations of wood manufactures. In 1904 it fell away somewhat, but it recovered in the following year. In 1901 there was imported \$2,562,754 worth of this product, \$2,765,695 in 1902, \$3,100,652 in 1903, \$2,890,792 in 1904 and \$3,016,314 in 1905. The following table shows the importations of wood manufactures, by decades, from 1830 to 1900 inclusive. The magnitude of the figures shown as received from British North America in 1870 is accounted for in that all the statistics of importations of wood for the year are bunched—with the exception of cabinet woods—in this total.

IMPORTS OF CABINET WARE AND OTHER MANUFACTURES—PRINCIPAL COUNTRIES BY DECADES, 1830 TO 1900.

COUNTRIES.	1830.	1840.	1850.	1860.	1870.	1880.	1890.	1900.
United Kingdom.....	\$ 28,228	\$ 46,120	\$ 70,444	\$ 78,339	\$ 218,155	\$ 270,270	\$ 396,860	\$ 246,523
France.....	31,676	92,141	123,526	128,271	183,229	181,627	432,079	426,952
Germany.....	38,542	79,025	100,384	189,124	420,113	230,811	601,220	506,356
British North America...	1,776	4,664	26,337	45,101	8,610,733	217,497	93,292	181,766
China.....	6,852	4,713	234	32,887	15,947	21,200	27,101	95,747
Holland and Belgium...	1,699	2,899	19,973	4,976	34,353	57,382	34,223	98,419
Japan.....	.....	.....	.....	.....	18,204	109,704	46,343	162,246
Total all countries.	\$112,047	\$234,752	\$353,981	\$510,438	\$9,682,077	\$1,122,016	\$1,865,772	\$2,348,936

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